

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 642 (No. 15, Vol. XIII.)

APRIL 14, 1921

[Weekly, Price 6d.
Post free, 7d.]

Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:

United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

* European subscriptions must be remitted in British currency

CONTENTS

	PAGE
Editorial Comment	
An Effect of Encouragement	251
A Chance for Captain Guest	252
Night Flying in France	252
Aerial Mails in Parliament	252
On the Brussels Air Service: St. Denis Westrem Aerodrome	253
London-Continental Services	254
The Morane-Saulnier Monoplane	255
A One-Stop Flight Across the U.S.A.	256
The Parker Variable Pitch Airscrew	257
The 1,200 h.p. L.W.F. "Owl"	258
Royal Aeronautical Society Official Notices	259
Notices to Airmen	259
The Van Berkel Type W.B. Seaplane Monoplane	260
Personals	261
Airisms from the Four Winds	262
Airship Sheds and their Erection	263
Royal Air Force	265
Imports and Exports	266
Sidewinds	266

INDEX AND TITLE PAGE FOR VOL. XII.

The 8-page Index for Vol. XII of "FLIGHT" (January to December, 1920) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1/- per copy, post free.

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

April 13-20	Monaco Seaplane Meeting
April 20-22	Aero Club of France Grand Prix. 3rd stage
May ...	Seaplane Contests on Lake Garda, Italy
May 15 ...	Entries Close for Schneider Cup
May 21 ...	U.S.A. National Balloon Race, Alabama
June 10 ...	Race, Lugo-Trieste-Triente-Lugo
July 16 ...	Aerial Derby
July 29-31	Jacques Schneider Cup, Venice
Sept. 4-11	Brescia Races
Sept. 5 ...	Pulitzer Trophy, Detroit, U.S.A.
Sept. ...	Gordon Bennett Balloon Race
Sept. 25-	
Oct. 2	Aero Exhibition, Prague
Nov. ...	Paris Aero Salon

EDITORIAL COMMENT



HERE seems to be some amount of doubt in many minds as to the wisdom or otherwise of giving tangible encouragement to essential industries, such as that of aircraft construction and operation, from the funds of the State. It is argued by those who are against the principle that it has never been done, that it is foreign to all British ideas of true economic policy, and that it should follow that if an industry cannot stand on its own feet without national assistance, it should be allowed to die. Generally, we agree that the principle is a perfectly sound one, and we should dissent very strongly from the idea that every industry which finds itself in difficulties should receive a subsidy from the State. We are even now passing through an industrial crisis which has at its root the application of the basic principle that industry should work out its own salvation. The coal crisis, however, stands on a very different plane to that through which aviation is passing. In the one case, an industry, admittedly vital to the prosperity of the country, has been for some years receiving direct aid from the taxpayer in order to tide it over an abnormal time. It was quite right that it should receive such assistance, but the time has come now when that industry should be able to, and could, stand by itself, and in the realisation of that fact it is now being asked by the State to so stand. One side of those concerned in the industry does not like the new order of things, and hence the trouble. However, we are not discussing the coal crisis, and have only introduced the illustration to point a moral.

It would be perfectly fair to draw a parallel between the present position in which the aviation industry stands and that of the mines before Government control was instituted and wages were regulated in accordance with Government instructions. The mines then were, owing to the War, losing money. The State could not afford to see them close down, and so agreed to subsidise the industry through its bad time, with the distinct understanding that when that time had passed they would have to

revert to the old order of things. In the case of the aviation industry, which in time to come is likely to be as vital to the nation as coal itself, it is passing through a time which may best be described as its teething stage, when it requires just such assistance as was given to the mines. We and others have argued this out so often that there is no need to elaborate the case further at the moment.

What we should like to do, however, is to point out the effect that such assistance as the industry is asking is producing in countries where subsidies have been given by Governments with more vision than our own. In France, for example, where the industry is subsidised on a fairly generous scale, we see that designers are turning attention to commercial machines, and are actually producing types which are far and away better for their purpose than the converted war-machines which have hitherto been in use. We are describing and illustrating one of the latest of these new designs in this issue of *FLIGHT*, the Saulnier, which we have no hesitation in saying is a direct production of the encouragement which the French Government is extending to the industry in its time of infantile trouble.

As we have said, the direct result of French policy is that the commercial machine is engaging the major attention, because designers and constructors can now see their way to tiding over the interval and, in the near future, placing their industry on a basis which will be completely independent of all outside assistance. In the meantime, such of our own designers as remain in their old occupation are in the main busy on designs of Air Ministry machines, because there is at the moment little money in the commercial design.

A Chance for Captain Guest

There has been a good deal of talk recently about a subsidy of a quarter of a million pounds, to be paid for the ensuing five years. This, it is said, is not to be obtained by an addition to the Air Estimates, but by effecting all-round economies in the Air Ministry. It is all very good news, if it is true. If it is not, let us know at once, so that the industry may know where it stands. If it is, it is up to the new Air Ministry to say so immediately, and to supplement the information by telling us how it is to be applied. Time is getting very short, if the industry is to be saved at all. The arrangements for carrying on the cross-Channel services are well enough in their way, but they are only an incident in what has to be done if the British aviation industry is to survive in face of subsidised foreign competition.

As though it had not enough difficulties to encounter already, the present Labour crisis is working a great deal of harm to what is left of the British industry. A few days ago it was announced, for example, that the firm of Messrs. S. Saunders and Co., the famous yacht and aircraft builders of East Cowes, had decided, in view of increasing labour difficulties, temporarily to close down the motor boat and aviation department of their business until times become more normal. One way and the other, we are certainly passing through troublous times!

We are quite confident that if the Government would formulate a policy and carry it through without any further delay, the industry would soon recover, and well inside the five years which is set as the limit of time during which the subsidy is to run, it

would be able to support itself without asking for a penny from the State. The trouble is, and has been, that there is apparently no policy but one of drift. In the meantime we are losing as much ground in a month, in comparison with France and others, as we shall be able to recover in a year if the necessary steps are not taken at once. Captain Guest has a great chance if he will take it. Will he, or is he waiting for Mr. Churchill to make up his mind?

Night Flying in France

Commercial aviation in France, under the direct encouragement of the Government subsidy, seems to progress apace more and more. It has been realised, as it has been here, that if commercial aviation is to rival its competitors by land and sea it must be capable of giving services all round the clock, so to say. That is, it is no good for the company engaged in operating aerial services to say it is very sorry, but it is impossible to carry passengers and goods to a certain destination by a certain time because flying by night is not a practical proposition. Trains and steamships can run at night, and if the aeroplane is to compete with them it must be able to fly during the hours of darkness. As a matter of fact, there is no particular difficulty about night flying, given that the necessary arrangements are made and are in order. These arrangements consist in lighthouses to guide the aviator on his way, and adequately lighted landing grounds to accommodate him on his arrival at the intermediate and terminal ports of landing.

France, as a part of the programme she has set out to complete in order that she may retain her lead in the air, is busily completing arrangements for lighting the various aerial routes she already has in operation. Lighthouses are presently to be erected on the Paris-Warsaw, Paris-Amsterdam, Toulouse-Casablanca, Paris-Strasbourg, and Paris-London routes. The last, on the French side, is to be put in hand forthwith, and the Strasbourg route is being surveyed with the same object, so that it is more than possible that the present summer will see night services established on these two lines, if not on any of the others. We wish we could see substantial evidence of similar enterprise here.

Aerial Mails in Parliament

Mr. Gilbert asked the Postmaster-General the other day what are the present arrangements by his Department for an air-post service for letters and parcels; to what places and countries these services are operative from London, and what are the postage rates; and if his Department are considering an extension of such air-post services.

Mr. Pease, who replied, said that air mail services are in operation between London and Paris and London and Brussels. Letter packets, including letters, post-cards, printed papers, commercial papers, and samples, are accepted for transmission by these services, but not parcels. Letters may be sent by each service, not only for places in the country in which the air service terminates, but also for places beyond to which the normal mail route lies through that country. The special air fee payable, in addition to the ordinary international postage rates, is 2d. per ounce in each case, but the charge to Brussels will probably be increased in the near future. It is, he said, hoped to establish very shortly an aerial mail service between London and Amsterdam, and



ON THE BRUSSELS AIR-SERVICE : The famous aerodrome at St. Denis Westrem *en route* for Brussels, as seen from a Handley Page aeroplane. Note the furrows ploughed by the Germans when they evacuated this landing ground, which were still in evidence a year after their retreat.

also to give the public in this country an opportunity of posting letters for conveyance to Holland by ordinary mail and thence by air mail to Bremen, Hamburg, Berlin and Copenhagen.

There is very little in the answer which we did not know before. It is good to have the assurance that before long we shall be able to send our letters by steamer to Holland, for enterprising Dutch and German air lines to carry them on to their destinations by aeroplane! We should much rather have had to

record that British lines were to carry our mails right through, or, if that is not possible in the present state of international arrangements, at least by air to Holland.

By the way, the Assistant Postmaster-General did not tell the House that the London-Amsterdam service is not to be a British one at all, though a good deal of play has been made with the fact that the engines to be used are British and that British pilots are to be employed.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN MARCH 13 AND MARCH 24, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
			Mails	Goods				
Croydon-Paris ...	41	120	5	26	38	2 36	Breguet F-CMAC (2h. 6m.)...	B. (6), Br. (1), D.H.18(1), G. (4), Sa. (2), Sp. (3), V. (1).
Paris-Croydon ...	42	172	12	21	37	2 54	Spad F-CMAY (2h. 16m.) ...	B. (7), D.H.18 (1), G. (4), Sa. (2), Sp. (3), V. (1).
Cricklewood-Paris ...	6	49	5	6	6	3 21	H.P. G-EATK (2h. 50m.) ...	H.P. (3).
Paris-Cricklewood ...	8	43	—	—	8	3 23	D.H.9 G-EAUC (2h. 45m.) ...	D.H.9 (1), H.P. (3).
Croydon-Brussels ...	16	10	9	7	16	2 28	D.H.4 O-BATN (1h. 44m.) ...	Av. (2), D.H.4 (6), D.H.9 (3), G. (1).
Brussels-Croydon ...	10	10	8	7	8	2 51	D.H.9 O-BEAU (2h. 3m.) ...	D.H.4 (1), D.H.9 (4), G. (1).
Totals for two weeks...	123	404	39	67	113			

* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.1. D.H.4 = De Havilland 4, D.H.9 (etc.).
 F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. N. = Nieuport. P. = Potez.
 Sa. = Salmson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

Air Force Reserve and Triple Alliance Threat

IN addition to the call to the Navy and Army Reserves, under the state of "great emergency," proclamation was made on April 8, calling out the (a) Air Force Reserve, and (b) continuing airmen in the Air Force service.

These Proclamations set out that—

The present state of public affairs and the threatened dislocation of the life of the community occasioned by the existing strike in the coal mines and its threatened extension to the railway and transport services of the country have, in our opinion, constituted a state of great emergency within the meaning of the said Act.

The Army Reserve and the Air Force Reserve are accordingly "called out on permanent service," and all soldiers and airmen who would otherwise be entitled to be transferred to their respect Reserves are ordered to continue in Army or Air Force Service until legally discharged or transferred to those Reserves.

We understand that the response for the Air Force was "as one man."

Captain Guest's estimate for the Air Force is an addition of 10,000 men to the 30,880 in the original estimate.

R.A.F. Reserve Class G

THE Air Ministry desire to draw the attention of ex-airmen, who on demobilisation were transferred to Class G of the Royal Air Force Reserve, to the fact that Class G of the Reserve was disbanded, and airmen therein were deemed to be discharged as from April 30, 1920. Such men are therefore not now liable for service with the Royal Air Force.

Naval Joiners for the R.A.F.

THE Admiralty have notified to the Fleet that the Air Ministry are prepared to consider applications from joiner ratings in the Royal Navy who may desire to be transferred to the Royal Air Force. It is not anticipated that more than 50 can be spared for this purpose. Ratings accepted will be

given R.A.F. rank equivalent to that previously held in the Royal Navy; chief joiners would become flight sergeants; joiners, 1st to 4th class, sergeants; and joiners, 5th class, corporals. Conditions of service and rates of pay are published in Navy orders, and it is notified that time served in the Navy will count towards R.A.F. pension. It is also pointed out that all warrant officers and N.C.Os. in the R.A.F. have to be qualified in discipline and administration, in addition to the technical duties appertaining to their rank and trade.

Short Service Commissions in R.A.F.

THE Air Ministry announces that the lower age limit for candidates for short service commissions is now 18. Full particulars can be obtained by written application to the Secretary (S. 7), Air Ministry, Kingsway, W.C. 2.

Scandinavian Customs Aerodromes and Air Corridors

THE Swedish Government has, we learn, instructed the Swedish delegates of the Scandinavian Air Navigation Commission to draw up, with the Norwegian and Danish delegates, schemes for common Customs aerodromes and air corridors for air traffic between Sweden, Norway and Denmark. Lieut.-Col. G. Sylvan and Capt. T. V. Lubeck, Chief of the Swedish Naval Air Service have been appointed additional Swedish delegates on the above Commission

Macchi Machines in U.S.A.

APPARENTLY the Italian makers of the Macchi aeroplane are looking to America as an early market for their machines, as they have already sold in the United States some twenty of their M. 16's, and it is stated with more to follow.

A Berlin-Moscow Air Mail?

THE Lithuanian Government, it is reported, has informed the Russian Soviet Government that the preliminary steps have been taken to run regular mail services between Berlin, Kovno, Riga and Moscow.

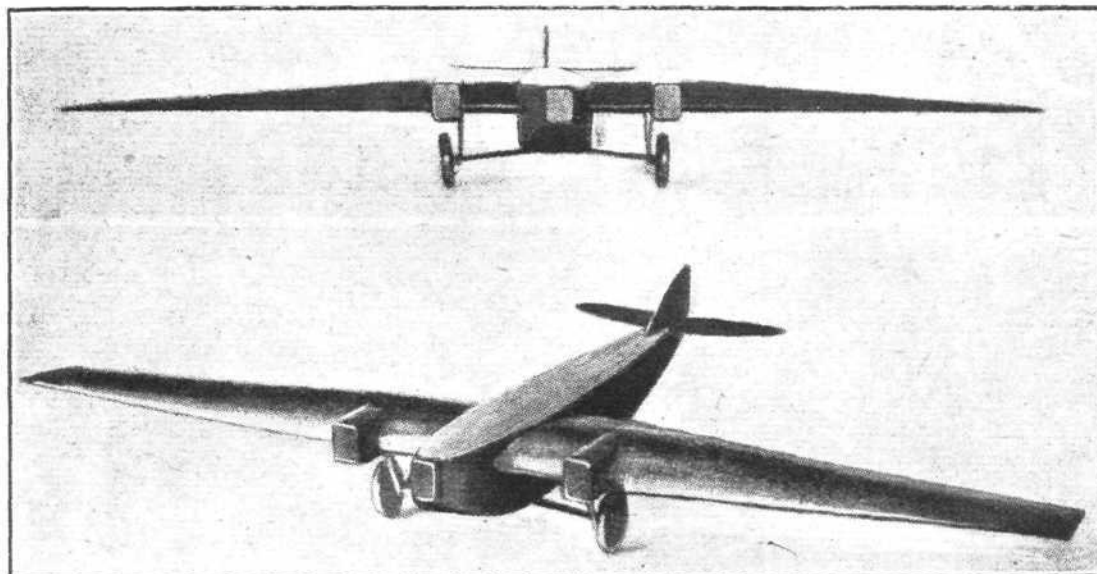
THE SAULNIER THREE-ENGINED CANTILEVER MONOPLANE

An Interesting French Design

As an object-lesson in the beneficent effect of Government encouragement, it is interesting to watch the activity of the French aircraft industry, and to compare it with the comparative inactivity of that of this country, where lack of Government policy has resulted in the dispersal of nearly all our designing staffs. During the last twelve-months or so quite a large number of new commercial aeroplanes have been designed and produced by French constructors, while in this country, apart from a few machines designed for the Government competition at Martlesham, few if any new commercial machines have been put into commission. To

description and illustrations of this machine. Following is a translation of the description of the Saulnier three-engined cantilever monoplane:—

"The three-engined R. Saulnier is a monoplane of 27 ms. (88 ft. 6 ins.) span, with a thick wing attached directly to the fuselage without external bracing. The wing area is 1116 sq. ms. (1,250 sq. ft.). The machine is built of metal throughout, with exception of the wing and fuselage covering, which is fabric. The wing section is such as to satisfy aerodynamic considerations, and at the same time give room for spars of sufficient depth to withstand the bending moment on the



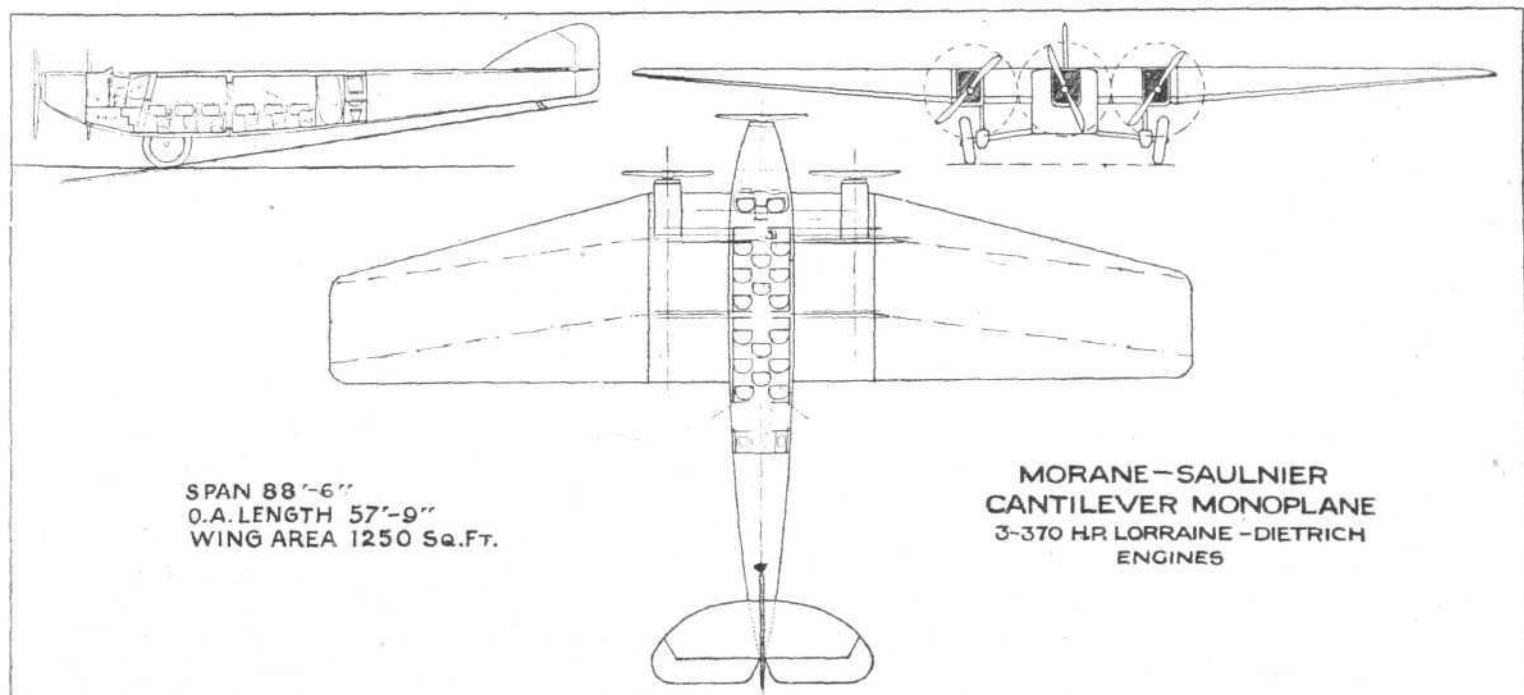
Two views of a wind-tunnel model of the Morane-Saulnier cantilever monoplane.

take one side of the question only: the French subsidy to air services has already resulted in French constructors getting busy on the production of machines designed especially for commercial work, while here we are, after letting all the air services expire for lack of encouragement, resuming a few of them again with obsolete or obsolescent machines, simply because there has been no assistance forthcoming for producing machines really suitable for the work in hand, and which could reasonably be expected to show a profit on a line like the London-Paris. In our last issue reference was made to a new Saulnier three-engined monoplane, the design of which has just been completed. This week we are able, by the courtesy of our French contemporary *L'Air*, to give a brief

wings. The section has been chosen after numerous experiments at the Eiffel Laboratory.

"The wing spars are in the form of lattice girders, composed of Duralumin sheet and profiles. This girder supports the wing engines, and serves as attachment for the struts of the undercarriage. The wing engines are placed in front of the front wing spar, on frameworks integral with the spar. The petrol tanks are placed aft of the wing engines, between the spars. There is no petrol in the fuselage, and a form of ripping panel is provided for emptying instantly the tanks in case of fire. The tank capacity is sufficient for a flight of seven hours' duration.

"The rectangular section fuselage is built entirely of Duralu-



SPAN 88'-6"
O.A. LENGTH 57'-9"
WING AREA 1250 Sq.Ft.

MORANE-SAULNIER
CANTILEVER MONOPLANE
3-370 H.P. LORRAINE-DIETRICH
ENGINES

THE MORANE-SAULNIER CANTILEVER MONOPLANE: General arrangement drawings.

min. In the nose is mounted the central engine, and at the stern is carried a monoplane tail. The pilot and his assistant are placed behind the central engine, and stairs lead from their cockpit down into the cabin. Tunnels running along in front of the front wing spar give access to the wing engines during flight. The cabin is very roomy, with 16 seats, leaving room for a passage to the entrance doors at the rear of the cabin. Under the floor of the pilot's cockpit is a space for luggage, measuring $1\frac{1}{2}$ cubic m. The power plant consists of three Lorraine-Dietrich engines of 370 h.p. each driving tractor airscrews. The machine will get off with only two engines running; consequently the stoppage of one of the engines will not force the machine to come down, but will merely reduce the speed somewhat. Toward the end of a flight, when nearly all the petrol has been consumed, the machine will fly on one engine only at an altitude of 500 ms. (1,640 ft.).

"The weight of the machine empty is 4,300 kgms. (9,450 lbs.) out of which 2,000 kgms. (4,400 lbs.) is accounted for by the three engines. The maximum weight of the machine with full load is 7,000 kgms. (15,400 lbs.). There is thus a disposable lift of 5,950 lbs. for petrol and useful load. The following table gives the disposable useful load according to the amount of fuel carried, and the distance travelled, based on a commercial speed of 200 kms. (124 miles) per hour:—

Duration (hours)	7	6	5	4	3	2
Weight of fuel (lbs.)	3,850	3,300	2,850	2,200	1,650	1,100
Useful load (lbs.)	2,090	2,650	3,100	3,750	4,300	4,850
Distance (miles)	870	745	620	496	372	248

"In reality, the distances covered will be greater, since the weight of fuel has been calculated for full power (370 h.p.) while the speed of 200 kms. (124 miles) per hour refers to an altitude of 1,500 ms. (4,925 ft.) with the engines developing 270 h.p. only.

"The useful load may be composed as follows:—

Pilot and assistant	360 lbs.
Tools and wireless	220 "
Eight passengers (each with 44 lbs. of luggage)	1,760 "
Goods or mail	310 "
Total	2,650 "

"It will thus be seen that for the journey Marseille-Algiers, for instance (800 kms. = 497 miles), the machine can carry six hours' fuel, leaving a reserve for adverse winds, and have 1,200 kgs. (2,650 lbs.) available for useful load.

"A $\frac{10}{338}$ scale-model, tested at the Eiffel Laboratory, gave the following results:—

Incidence.	..	..	— 5°	0°	5°	10°
R _x (in grammes and metre/sec.)	..	..	22·1	23·5	40·1	71·1
R _y (in grammes and metre/sec.)	..	..	47·5	192·3	424·6	652·7
R _x	..	..	—	0·122	0·0944	0·1089
R _y	..	..	..	..	..	..

"The best value of $\frac{R_x}{R_y}$ is 0·093 at an incidence of between 2° and 3°. These results constitute a record at the Eiffel Laboratory, and represent the maximum 'finesse' ever attained with any model, leaving far behind the 175 km./hour which would be the speed of a biplane with the same power. [By this is, presumably, meant the same power loading.—ED., FLIGHT.]

"The polar diagrams enable one to study, and bring out, the performance of the machine. In the following are examined three cases: (a) Total weight of 6,300 kgs. (13,850 lbs.) and engines at normal power (N.P.); (b) total weight 7,000 kgs. (15,400 lbs.) and engines throttled (T.); (c) total weight 5,000 kgs. (11,000 lbs.) with single engine running at normal power (N.P.).

Weight of machine (lbs.)	13,850		15,400		11,000
No. of engines	3 (N.P.)	2 (N.P.)	3 (T.)	2 (T.)	1 (N.P.)
Speeds at different altitudes—					
Ground level	145	123	129	106	93
3,280 ft.	141	119	125	99	87
6,560 ft.	138	115	121	—	—
9,850 ft.	134	108	114	—	—
13,100 ft.	128	—	—	—	—
16,400 ft.	119	—	—	—	—
Ceiling (ft.)	19,000	12,800	12,800	5,900	6,600

A ONE-STOP FLIGHT ACROSS THE U.S.A.

ON March 3 we briefly recorded that Lieut. Coney, of the 91st U.S. Aero Squadron, had crossed the United States on a "D.H.4" machine in 22½ hours' flying time. Further particulars are now to hand, which confirm this time, the total elapsed time from coast to coast being 36 hours 27 minutes, shortage of fuel compelling a descent at Bronte, Tex., where great delay was enforced before further suitable fuel could be obtained to continue the journey. The original object was to cross the United States in 24 hours, and except for this unfortunate fuel shortage, the trip would have been ended well within that time. Two pilots were nominated—one, Lieut. Coney, to start from the west, and the other, Lieut. A. Pearson, from the east, both flying rebuilt "D.H.4" army planes.

The latter early experienced engine trouble, and by the time the repairs were effected it was not thought worth while continuing.

Lieut. Coney's machine was adapted to carry extra fuel considered good for 14 hours' flying—294 gals.—and 30 gals.

oil were carried under the fuselage. His start for the flight was at 7 p.m. on February 21 from Rockwell Field, and the schedule provided for a halt at Love Field, Dallas, Tex. During his night travelling he encountered heavy snow and rain storms over New Mexico, these adverse conditions leading to his fuel shortage and landing, as mentioned above, at Bronte. Here the difficulty of getting decent fuel kept him until nightfall, when he again pluckily took the air for a second all-night flight. Fortunately he encountered no further trouble, and successfully landed at 7.27 a.m. on February 24, at Pueblo Beach, having been in the air for 22 hours 30 minutes. Lieut. Coney, who carried a package of official mail from the Commander of the San Diego Naval Air Station to the Pensacola Commander, reached his greatest height, 17,000 ft., when passing over the Mississippi River, to escape a heavy fog. Over the Rockies Lieut. Coney nearly ran into a snow-capped peak, but fortunately marked it down in time to steer round the danger.

Aleppo-Alexandretta Air Service

THIS air-mail service, to which reference was made some little time ago in FLIGHT, is now operating regularly three times a week, and transports both civil and military mail. Special "air-mail" stamps have been issued. It will be remembered that it is this service which, taking about one hour per journey, displaces the previous rail and steamer route occupying eight to ten days! A similar service is now proposed between Hama and Latakia.

Opening Up Belgian Congo by Air

IN a recent lecture respecting aviation prospects in the Belgian Congo before La Société Belge des Ingenieurs et des Industriels, Colonel Van Crombrugge, Director of Aeronautics at the Ministry of National Defence, stated, in connection with the Kinshasa-Stanleyville air line, that the Forminière Company, which exploits diamond mines at Djoko-Punda in the Province of Kasai, has requested the institution of a service between Kinshasa and the mines. The journey is one of 800 kilometres and the distance can be covered in two

days by aeroplanes, whereas 35 to 40 days are at present required for the journey by boat. A route is being studied and will be decided upon almost immediately the company having offered to defray the greater part of the initial costs.

Colonel Van Crombrugge also said that it had been decided to survey and chart the river Congo by means of aerial photography and that it is hoped to complete this work in 2 or 3 years instead of the 10 to 15 years which would have been required if the present methods had been maintained.

Mexico to Start an Air-Service

THE Mexican Government are calling for tenders for the establishment of an air service between Mexico City and Tampico for the transport of passengers and express correspondence.

Geneva Customs Aerodrome

FROM March 1, 1921, the aerodrome of Cointrin ($\frac{1}{2}$ km. north-west of Geneva), it is officially announced, replaces St. Georges (the temporary Geneva Customs Aerodrome), as the Customs aerodrome.

THE PARKER VARIABLE PITCH AIRSCREW

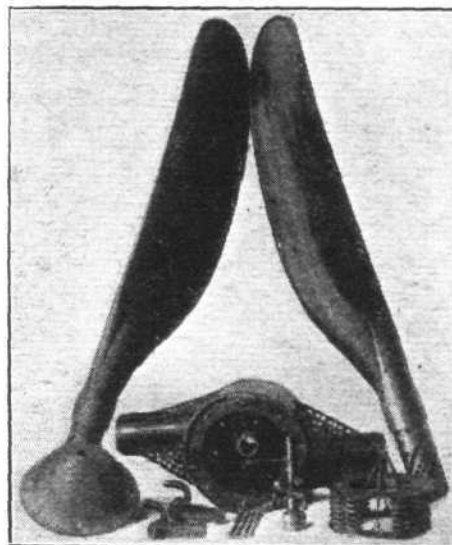
ONE of the principal obstacles met with in the problem of high altitude flying is undoubtedly the question of varying the pitch of the airscrew according to change in atmospheric conditions. Thanks to the supercharger, the engine power may be kept fairly constant within big ranges of altitude, but in spite of this little advantage is gained if the pitch of the airscrew does not harmonise with prevailing conditions—what we gain on the swings we lose on the roundabouts. Many attempts have been—and are being—made to produce a really efficient and practical variable pitch airscrew, but the difficulties and “snags” in the way of success are many. An experimental variable pitch airscrew that appears to have given certain satisfactory results as far as trials have been made up to now, is that shown in the accompanying illustrations, which is the invention of Billy Parker, of U.S.A., who has spent some six years in developing it.

The most important feature of the Parker variable pitch airscrew is that it is automatic in operation. As the engine speeds up after leaving the ground, the pitch of the blades increases, and likewise as the machine climbs into higher altitudes where more rarefied air is encountered, the blades automatically increase their pitch—so that the same load is kept on the motor at all speeds and conditions of flight, except in climbing, when the pilot can by pushing a button make the blades assume their best climbing angle. Furthermore—and this has been borne out in actual practice—when the engine misfires, or for any other reason loses power and slows down, the blades immediately decrease in pitch, and do not overload the engine. In fact, they assume pitch dimensions of a screw for the horsepower that the engine is actually delivering at the time.

The airscrew shown in the accompanying illustrations has been in actual use for the past two years, and has given surprising results, although of course later models are much lighter and have a smaller and more streamline boss. So far the inventor has only been able to carry out tests with this

The same machine fitted with Parker airscrew:—

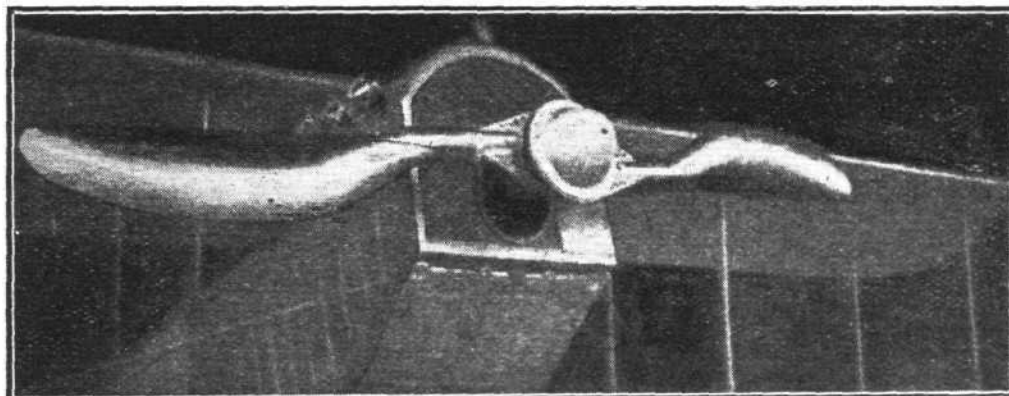
Maximum speed	118 m.p.h.
Climb in 1st minute	720 feet.
Ceiling	16,500 ft.



THE PARKER VARIABLE PITCH AIRSCREW :
General view of the component parts

The tests from which the above figures were obtained were made on the same day under the same conditions—the speed test being over a triangular course at 100 ft.

It should be noted that the engine and machine were designed for low flying rather than altitude, hence the but slightly improved ceiling. The following method of obtaining



The Parker Variable Pitch Airscrew : The airscrew fitted to the Curtiss machine

airscrew on comparatively low-powered machines of high head resistance, but, fitted to a high-powered, high-speed machine equipped with a supercharger, it is anticipated that it will be possible to attain speeds of from 300 to 400 m.p.h. at an altitude of 30,000 to 40,000 feet. However, the accompanying figures as regards a comparative test carried out on a biplane fitted with the Parker variable pitch airscrew, and without, are of interest:—

Type of machine	Dewey A.1. Scout.
Span	36 ft. 6 ins.
Chord	4 ft. 6 ins.
Motor	Curtiss OX5.
Airscrew	Curtiss D5,000, 8 ft. x 5 ft. 3 ins.
Maximum speed	86 m.p.h.
Climb in 1st minute	410 ft.
Ceiling	14,000 ft.

Aero Club of France President and Officers

For the ensuing year, the Aero Club of France have re-elected M. André Michelin to the President's chair, the Vice-Presidents being Count de la Vaulx, Rodolphe Soreau and in the place of M. Jacques Balsan, M. Tissandier. M. Georges Besancon remains Sec.-General, M. Pierre Gasmer du Fresne Treasurer, and the Members of the Council are MM. Blériot, Col. Ferrus, Alfred Leblanc, Paul Rousseau and Surcouf.

the correct angle of pitch for any particular conditions is employed by the inventor. Having attained a little more than the desired elevation, the machine is made to dive a little way to speed up the engine, so increasing the pitch of the blades, which can be maintained thus (by the same wire and button that regulate the altitude or climbing control) after a normal line of flight has been resumed. After a few trials the pilot can make the blades assume nearly the correct pitch at once. It has also been found that by making the blades assume a comparatively high pitch after sufficient altitude has been attained, the motor can be throttled very low—as low as 400 r.p.m.) and the machine will maintain a fairly high speed, and use very little fuel.

The weight of the airscrew described above is 62 lbs., and the minimum and maximum length are 8 ft. and 8 ft. 2 ins. respectively; the minimum pitch is 3 ft. 6 ins., and the maximum pitch is 8 ft. 9 ins.

Reprisals Against the Mahsud

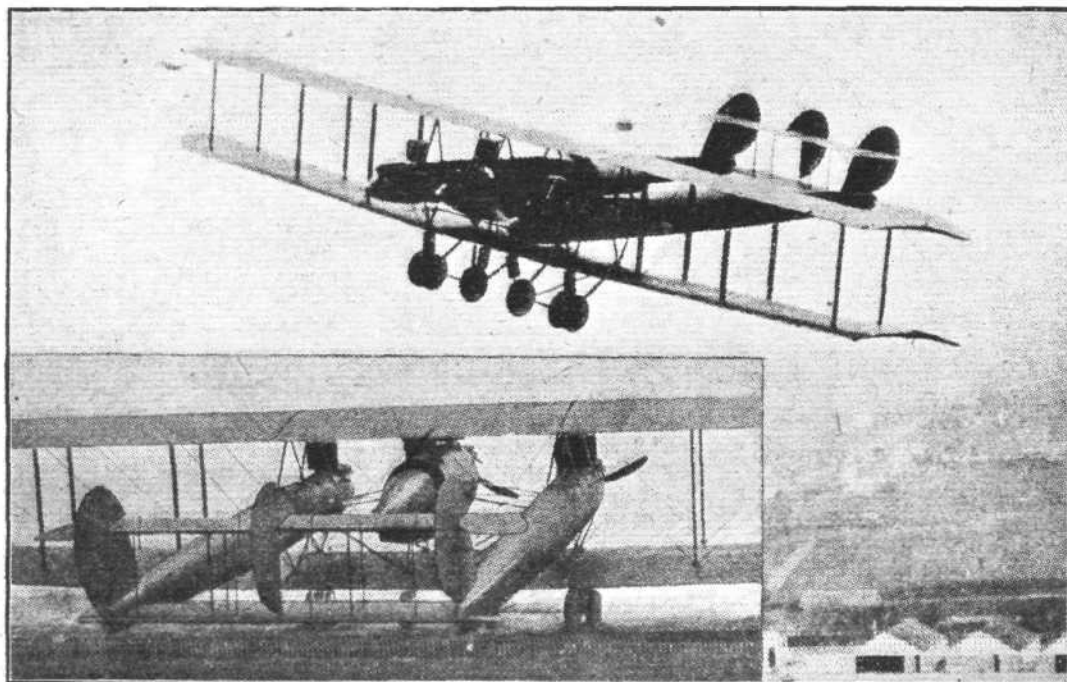
BRITISH aircraft, it is reported, on April 6, from Simla, bombed the Mahsud capital of Makin at the end of March, in reply to the recent growth of sniping and attacks on convoys in the Wana and Mahsud areas. Four heavy and 150 light bombs were dropped, and 1,800 rounds of small arm ammunition fired at various targets, causing heavy damage and loss to the tribesmen, who dispersed in various directions. Makin has been entirely evacuated.

THE 1,200 H.P. L.W.F. "OWL"

THE L.W.F. "Owl" was designed and built by the L.W.F. Engineering Co. of Long Island, N.Y., to meet the demand for a large freight and mail carrying aeroplane, and during its trials last year gave very encouraging results. It is of the twin fuselage-central-nacelle type, and by installing one of three different nacelles the machine may be converted for mail or freight, passenger, or night bombing work.

In the nose of each fuselage and the nacelle is a 400 h.p. high-compression Liberty engine, driving a 9 ft. 6 in. diameter tractor airscrew. Each power plant is complete within its respective fuselage or nacelle, and a radiator, with individual

and lower panels are of equal span, and the gap is 11 ft. The central panels, which are of about 20 ft. span, carry the fuselages, nacelle and under-carriage, the fuselages and nacelle being supported midway between the planes by stout V-struts. The ribs are built up first and then slipped over the spars, which are of the hollow box type, built up of four pieces—spruce for the top and bottom, and birch for the sides. Internal bracing is by double No. 8 solid piano wire and $\frac{3}{8}$ -in. hard cable. All external wire fittings are applied directly to the spars, and project through the covering. The upper plane, which is straight, is set at an angle of incidence



The L.W.F. "Owl" Triple-Engined Biplane: Two views showing the machine in flight, and, in-set, the fuselages and nacelle.

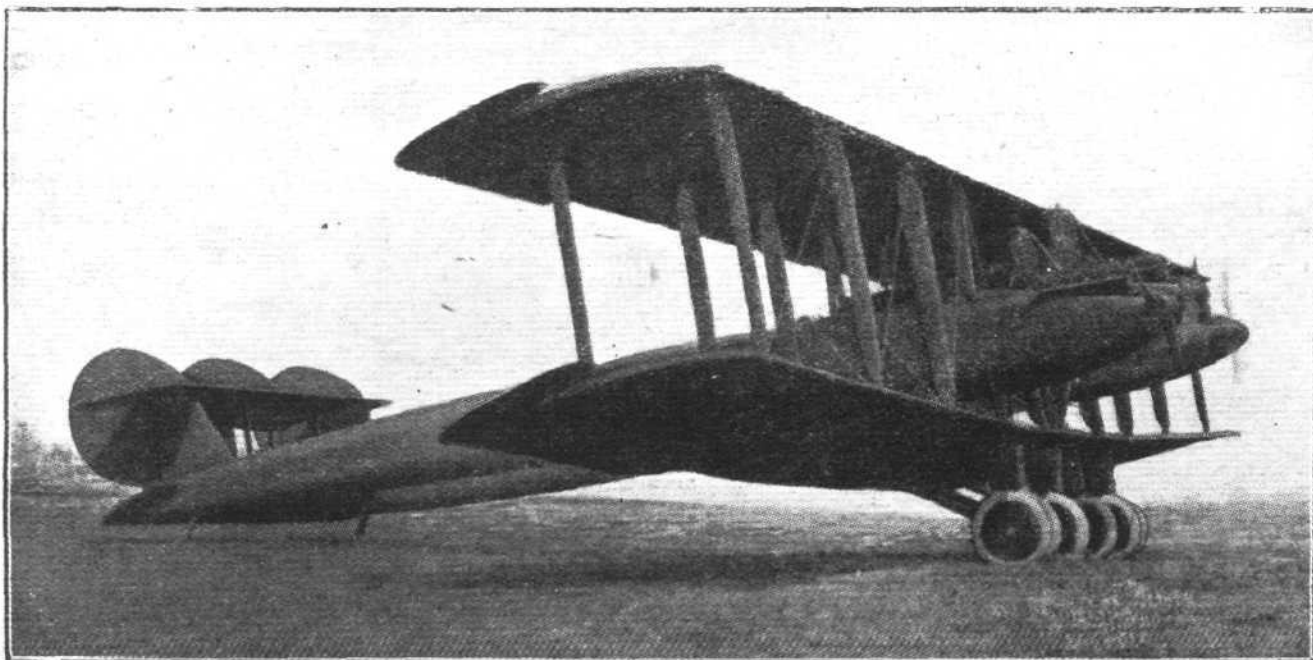
shutter control, is mounted above each engine, in the slipstream of the airscrew. As with previous L.W.F. machines, an important feature of the "Owl" consists of the monocoque construction of the fuselages and nacelle—a special form of laminated wood construction evolved by this firm. The fuselages and the nacelle—which are about 50 ft. and 27 ft. in length respectively—are well streamlined, and the main load, pilot and crew are carried in the central nacelle, only small auxiliary compartments, for excess mail or cargo, being provided in the fuselages.

The wing construction is of the Pratt truss type, consisting of three upper and three lower panels of 11 ft. chord; upper

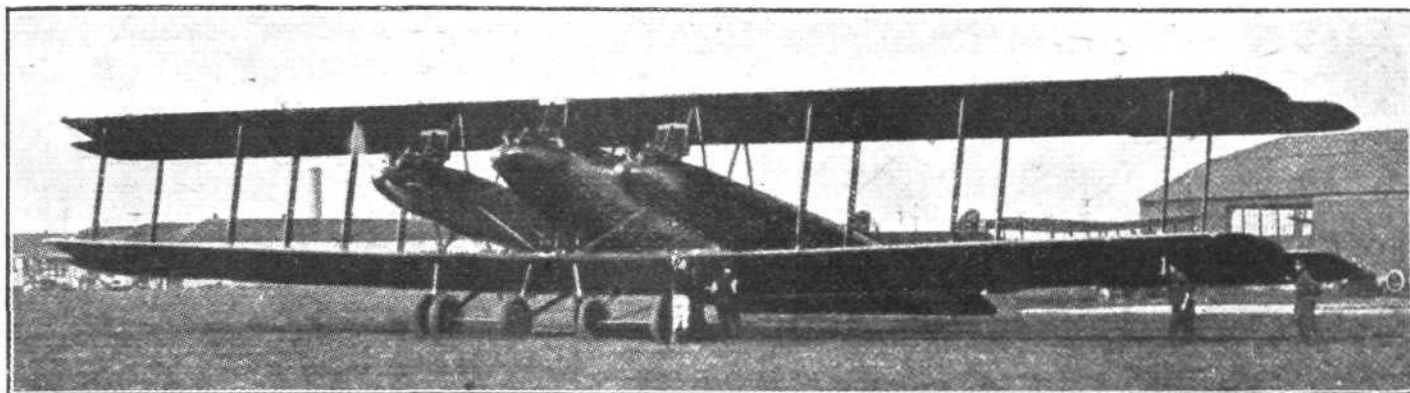
of $4\frac{1}{2}^\circ$, whilst the lower plane, the outer extensions of which have a dihedral angle, have $3\frac{1}{2}^\circ$ angle of incidence. U.S.A. No. 6 wing section is employed. Upper and lower planes have balanced interchangeable ailerons.

The tail is of the biplane type, attached to the rear ends of the two fuselages, and consists of two double cambered horizontal stabilisers, superimposed, with elevators hinged to the trailing edges, and a fin and balanced rudder mounted on the top of each fuselage. A third balanced rudder is mounted midway between the other two.

A six-wheeled two-axle landing gear is fitted, the outer wheels being arranged in pairs immediately under the fuselages,



THE L.W.F. "OWL" TRIPLE-ENGINE BIPLANE: Three-quarter front view.



THE L.W.F. "OWL" TRIPLE-ENGINE BIPLANE: Front view.

the inner wheels being located beneath the central nacelle. All are placed sufficiently forward of the centre of gravity to prevent the machine from turning over on its "noses."

The principal characteristics of the "Owl" are as follows:—

Span	105 ft.
Chord	11 ft.
Gap	11 ft.
Overall length	53 ft. 9½ ins.
Overall height	17 ft. 6 ins.
Area of main planes (with ailerons) ..	2,200 sq. ft.
Area of ailerons (4)	200 sq. ft.

Area of tail planes (with elevators) ..	174 sq. ft.
Area of fins	28 sq. ft.
Area of rudders	78.9 sq. ft.
Weight empty	12,600 lbs.
Useful load	7,600 lbs.
Loading per h.p.	16.6 lbs.
Loading per sq. ft.	9.1 lbs.
Speed range	55-110 m.p.h.
Climb to 10,000 ft.	30 mins.
Ceiling	17,500 ft.
Range	1,100 miles.

ROYAL AERONAUTICAL SOCIETY NOTICES



Council.—The full list of the Council for the year 1921 is as follows:—Air-Commodore H.R.M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C. (Chairman); Brig.-Gen. R. K. Bagnall-Wild, C.M.G., C.B.E. (Vice-Chairman); Dr. L. Bairstow, C.B.E., F.R.S.; Major F. H. Bramwell; Wing-Comdr. Cave-Browne-Cave, C.B.E.; Sir Robert Hadfield, Bt., F.R.S.; Capt. G. de Havilland, O.B.E., A.F.C.; Prof. B. Melvill Jones; Major A. R. Low;

Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P.; Lieut.-Col. A. Ogilvie, C.B.E.; Lieut.-Col. M. O'Gorman, C.B.; Dr. A. J. Sutton Pippard; Mr. A. V. Roe; Maj.-Gen. Sir R. M. Ruck, K.B.E., C.B., C.M.G.; Col. The Master of Sempill, A.F.C.; Major R. V. Southwell; Lieut.-Col. H. T. Tizard, A.F.C.; Brig.-Gen. J. G. Weir, C.M.G., C.B.E.;

Major H. E. Wimperis, O.B.E.; Honorary Treasurer: Mr. A. E. Turner.

Students.—It is proposed to endeavour to increase the interest of students by offering the Society's bronze medal annually for the best students' paper submitted, and by arranging for students' meetings for purposes of debating among themselves. In the latter connection it is hoped shortly to be able to announce the donation of a prize annually for the best paper initiating discussion at one of these students' meetings.

Silver Medal.—It has been decided to revive the practice of awarding the Society's Silver Medal annually for the best paper contributed to the *Aeronautical Journal* during the year.

W. LOCKWOOD MARSH,
Secretary

NOTICES TO AIRMEN

Wireless Direction-Finding Stations

BRITISH ISLES. 1. Stations:—In paragraph 1 of Notice to Airmen No. 17, 1921, Malin Head and Seaview should be omitted.

(No. 30 of 1921).

Aerodromes for Civil Use: Consolidated List

It is notified that—

1. Aerodromes, seaplane stations and landing grounds, open to civil aviation in the United Kingdom, and Service and Civil stations, available to civil aircraft in case of emergency only, are shown in new lists (A to D) which have been corrected to April 1, 1921.

2. The lists are classified as follows, each aerodrome or landing ground being given in alphabetical order:—

LIST A.—Government-owned Aerodromes available for civil flying at which accommodation exists

(a) Civil Aerodromes. (b) Service Stations.

LIST B.—Aerodromes available for civil machines in emergency only.

(a) Permanent Service Stations. (b) Stations temporarily retained for Service purposes. (c) Civil Stations.

British-Swedish Government Agreement

A PROVISIONAL agreement relating to air navigation has been entered into between the British and Swedish Governments covering most of the international requirements for air navigation for private and commercial aircraft.

LIST C.—Licensed Civil Aerodromes

(a) Civil Aerodromes licensed for all types. (b) Civil Aerodromes licensed as "Suitable for Avro 504 K and similar types of aircraft only." (Except in very few instances, accommodation does not exist. The licences have been issued for limited periods only. Foreshore aerodromes are not included.)

LIST D.—Unlicensed Private Aerodromes

Aerodromes available for civil machines only by special permission of the owners, or in emergency.

3. Customs Stations.—The only aerodromes at which Customs facilities exist at present are Croydon, Cricklewood and Lymington.

4. It should be clearly understood that these lists are purely provisional and are subject to alteration from time to time. Such amendments are published fortnightly as "Notices to Airmen."

5. In those cases in which it is stated that accommodation does not exist, no facilities other than the actual landing grounds are available.

6. No guarantee can be given at the present time that personnel to handle aircraft is available either at the Service Stations or at the Civil licensed aerodromes.

7. Notices to Airmen Nos. 1, 5, 14, 16, 19, 25 and 27 of the year 1921 are cancelled.

(No. 33 of 1921.)

Switzerland Acquiring War-'Planes

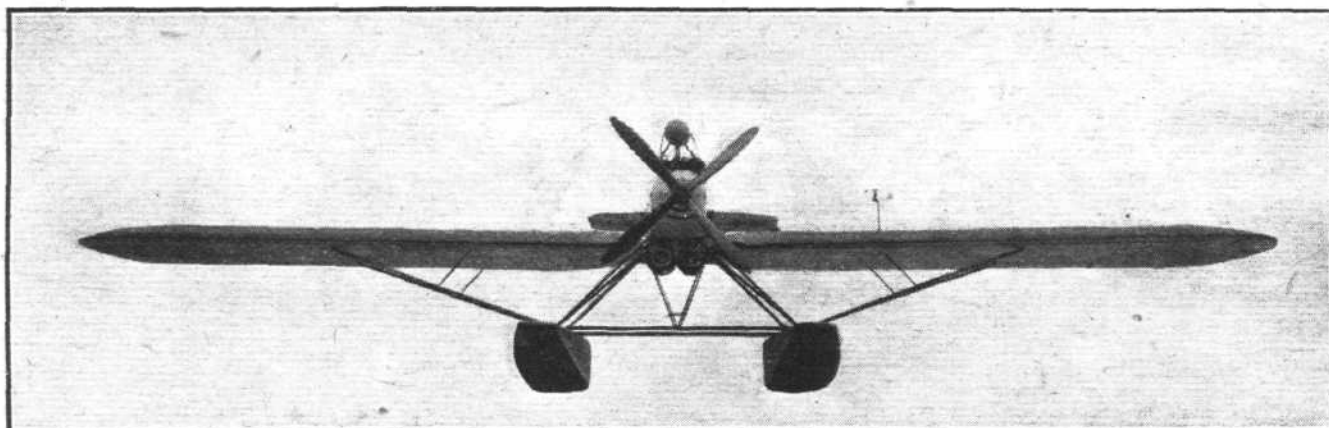
SIXTEEN Italian-constructed Hanriot-Nieuport planes have been acquired by Switzerland, and in addition they have bought ten Fokkers which were allotted to Belgium under the Peace treaty rights and declined by the latter.

THE VAN BERKEL TYPE W.B. SEAPLANE MONOPLANE

Rolls-Royce Eagle Engine

At the time of the Elta Show at Amsterdam in the summer of 1919 we published, it may be remembered, an illustrated description of a seaplane exhibited by the Dutch firm of Van Berkel's Patent of Rotterdam. This machine was a biplane with a tail similar to that of the Brandenburg machines of North Sea fame. In a more recent form, the Van Berkel machine is a monoplane with the wing placed where ordinarily the lower plane of a biplane is situated, and braced by streamline steel tubes from the twin-float under-

everything considered, this semi-cantilever arrangement is not to be preferred to the true cantilever wing. Certainly it should come out considerably lighter, and the resistance on the streamline tubes cannot amount to a great deal. A point which impresses one with regard to the wing is that the dihedral angle is very small for such a high c.g. Thus the Junkers monoplanes have been found to be very tricky laterally when near the stalling angle, in spite of the very pronounced dihedral angle of the wing. In the present



THE VAN BERKEL MONOPLANE : Front view

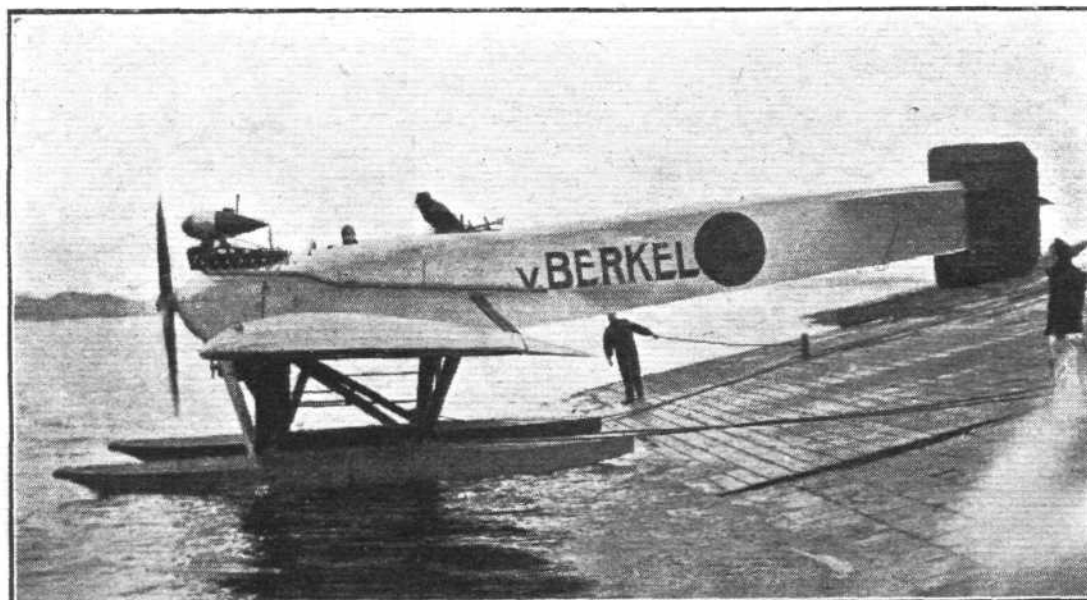
carriage. As several of these machines have been ordered by the Dutch Government for use, we believe, in the Dutch East Indies, a few notes dealing with the machine may be of interest.

From the accompanying photographs it will be seen that the Van Berkel W.B. follows closely the lines of the famous Brandenburg monoplanes which were at one time a pest in the North Sea. The flat-sided fuselage is very deep at the stern, and takes apparently the place of the usual vertical fin, of which none is fitted in front of the balanced rudder. The latter differs from that of the Brandenburg machine in that it extends and has a balance above as well as below the fuselage. Otherwise it is a matter of some difficulty to discover any difference between the two machines. Without

machine the wing is not tapered towards the tip, and possibly this fact may explain the reason for the small dihedral.

The two floats are built of aluminium alloy, as it has been found that the ordinary wood floats do not stand the climatic conditions in the Dutch colonies very well. They are of the three-stepped type, and terminate in a vertical stern post while the nose is rounded. The machine is said to get off well in spite of its heavy loading, and its speed when once in the air is quite good.

The engine fitted is a Rolls-Royce Eagle VIII commercial type, and drives a tractor airscrew. Cooling is provided by two Lamblin "lobster pot" radiators placed underneath the fuselage between the struts of the undercarriage. In view of the use for which the machine is intended, the radiators are

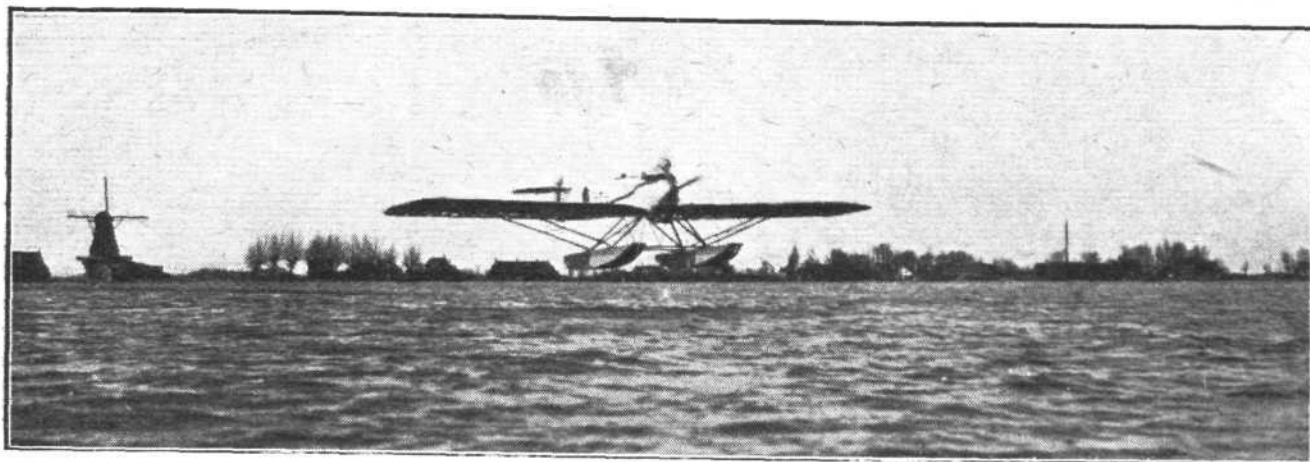


The Van Berkel Monoplane : Leaving the slipway at the naval air station at De Mok

knowing the detail construction, it is impossible to state whether this similarity is superficial only, or whether it extends to details.

The wing is of the semi-cantilever type, of fairly thick section and braced by a single pair of struts on each side. The photograph showing the machine in front view will give a good idea of the clean appearance. The bracing gives the impression of being very rigid, and it is a question whether,

of large size so as to ensure adequate cooling in the hot climate of the Dutch East Indian Islands. The armament consists of three machine guns, two of which are fixed and fire forward, the third being operated by the gunner, and of a nest of bombs. The petrol tanks have a capacity of 172 gallons, which gives a duration of about $7\frac{1}{2}$ hours at full throttle. At cruising speed the range is approximately 1,000 miles. The maximum speed at low altitudes has been officially measured as



THE VAN BERKEL MONOPLANE : Getting off from a lake near Rotterdam

180.2 kms. per hour (112 m.p.h.), which is rather good for a seaplane of this power and loading. The total useful load amounts to 2,100 lbs., of which approximately 1,350 lbs. is taken up by the petrol. As a long-distance reconnaissance

machine, the W.B. should prove quite useful in the colonies.

Its main dimensions are : Span, 64 ft. ; length overall, 36 ft. ; height, 14 ft.



Married

CHARLES CYRIL MARSDEN, late of the R.F.C., only son of Mr. and Mrs. Charles Marsden, of Standish Road, Hammer-smith, was married on April 2, at St. Paul's Church, Hammer-smith, to GERTRUDE KINGSTON, only daughter of Mr. THOMAS JARVIS, of Rowan Road, Brook Green, W. 6.

GEORGE SAMUEL SANSOM, B.Sc., M.C., D.F.C., of Kennel Moor, Milford, Godalming, only son of the late Samuel George Sansom and Mrs. Sansom, was married on March 30, at St. Mary's Church, Morte Hoe, to DOROTHY VIVIEN, youngest daughter of the Rev. FRANCIS VIVIAN DODGSON, M.A., of Sunny Cliff, Morte Hoe, N. Devon, and granddaughter of the late General Sir David Scott Dodgson, K.C.B.

Capt. WALTER STOCKDALE, D.F.C., son of Mr. and Mrs. H. W. Stockdale, of Alma Clocolan and Pietermaritzburg, was married on February 13 at St. Cyprian's, Durban, to NORAH EUSTACE, daughter of the late JUDGE FANNIN and of Mrs. FANNIN, of Pietermaritzburg.

To be Married

A marriage has been arranged, and will shortly take place, between Maj. A. G. HORSLEY CARR, R.A.F., and the Hon. Mrs. HAMILTON SIMPSON, 105, Coleherne Court, S.W., widow of Lieut. J. C. Simpson, R.E., and youngest daughter of Georgina Lady Belhaven and Stenton.

The marriage arranged between Wing-Commander SIDNEY SMITH, D.S.O., A.F.C., Air Ministry, London, and Miss WINIFRED POOLE BERRY, The Priory, Grantham, will take place at 2.30 p.m. on Wednesday, May 11, at St. Wulfram's Church, Grantham.

The engagement is announced between Flight-Lieut. GODFREY M. THOMAS, D.F.C., R.A.F., youngest son of Mr. Herbert T. Thomas and the late Mrs. Thomas, of Savanna-la-Mar, Jamaica, and Kew, and CONSTANCE CORDELIA, only daughter of Rear-Admiral Sir FRANCIS and Lady HAWORTH-BOOTH, of Haworth Hall, Hullbank, Hull.



LONDON TERMINAL AERODROME, CROYDON

Monday Evening, April 11, 1921

In spite of the fact that we are only at the beginning of April, the Continental passenger traffic through Croydon is already as large as during the summer of last year, and the Amsterdam service has not yet commenced.

The Instone Air Line, who have been maintaining a thrice weekly service to Paris under difficulties, whilst the two De H. 18s and the B.A.T. were being overhauled, have now all their machines serviceable and hope to commence a daily service shortly.

Cie. des Messageries Aériennes, with Capt. Greig, late of the Air Express, Ltd., as London Manager, have been particularly busy. No less than 27 flights have been made by their machines between London and Paris during the week.

The Belgium firm—S.N.E.T.A.—have now acquired two Farman Goliaths, one of which made its first visit to Croydon on Wednesday. The Grand Express Aériens are still running to Paris on alternate days, and compensate for their lack of machines by their huge capacity for passengers and goods. It is a good augury for the future of commercial aviation to see their parcels arriving at the aerodrome in a three-ton lorry.

The aerodrome is suffering from an epidemic of amateur gardening. Each firm vies with the others in producing the

best floral display. Mr. Boudier of the Grand Express is up to the present an easy winner, the garden in front of his office being a mass of bloom. He has also managed to 'beg, borrow, or steal' a lawn mower, apparently to provide exercise for his pilots when they are on the ground.

On Monday four machines left for Paris within a few minutes of each other, the De H. 18, with Mr. Powell as pilot, getting away first, closely followed by two Breguets and a Salmson. In the afternoon Mr. Keep arrived from Yeovil piloting the Napier-Westland which he handed over to the Air Ministry officials.

The two joy-riding firms, the Leatherhead Aviation Company and Surrey Flying Services, Ltd., had a busy day on Sunday. Captain Muir, of the Surrey Flying Services, did not appear to spend more than five minutes on the ground apart from the luncheon interval, from about 10.30 a.m. until dusk.

Mr. Basil S. Foster, who acts as the distributing agent for petrol and oil, is trying to arrange for bulk storage of petrol on the aerodrome. This would be of enormous advantage to all concerned, as with the present method of filling the machines from cans it takes nearly an hour-and-a-half to fill the De H. 18, whereas with bulk storage and a pump fifteen minutes will be ample.

AIRISMS FROM THE FOUR Winds.

WILL the new Postmaster-General make up for the want of initiative in his predecessor, by helping along commercial aviation with a double-barrelled push—firstly, by seeing that all first-class mail is, as quickly as may be possible, forced into the Air, and giving notice immediately of his intention in that direction; secondly, by issuing an air-mail postage stamp. The latter may appear to be a minor matter, but we venture to differ upon that point.

VERY smart was the conception and putting into effect of the "Leeds to Athens" recent hustle flight, as recorded at the time in *FLIGHT*. Now details are to hand from Handley Page Transport, Ltd., of this little stunt, no loss of glory to anyone concerned is to be found.

The total flying time from London to Athens was 21 hrs., 35 mins., and on the return journey 19 hrs. 5 mins. The total distance flown was about 4,000 miles.

At Athens the pilot, Mr. H. W. Perry, gave several demonstration flights, and took up members of the Roumanian and Greek Royal families. He flew Prince Christopher of Greece, younger brother of King Constantine, Prince Karl of Roumania, Princess Xenia of Russia, fiancée of Mr. W. B. Leeds, Princess Nina of Russia, and various military and naval authorities.

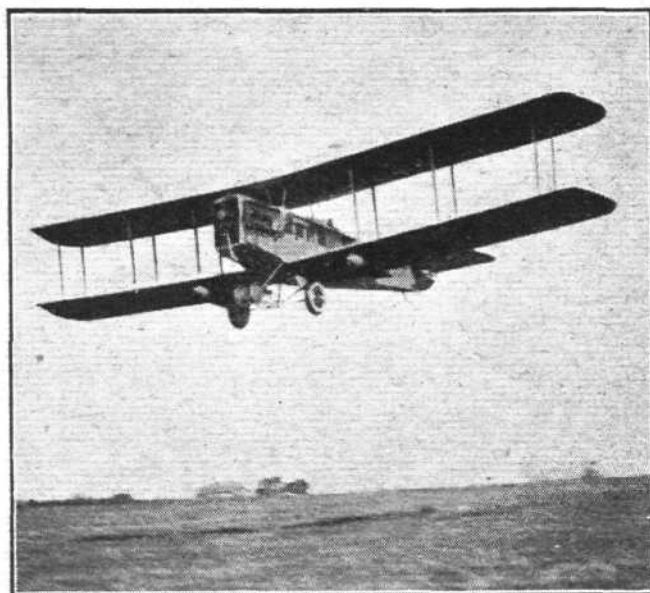
The following is the exact time-table, all the flights between the places named being non-stop on both journeys:—

Cricklewood to Paris, 2 hrs. 30 mins.; Paris to Lyons, 2 hrs. 50 mins.; Lyons to Nice, 2 hrs. 30 mins.; Nice to Rome, 4 hrs. 15 mins.; Rome to Brindisi, 4 hrs.; Brindisi to Agrennon, 4 hrs. 15 mins.; Agrennon to Athens, 1 hrs. 15 mins. Return journey: Athens to Brindisi, 3 hrs. 30 mins.; Brindisi to Foggia, 1 hrs. 30 mins.; Foggia to Rome, 2 hrs.; Rome to Nice, 4 hrs.; Nice to Lyons, 2 hrs. 35 mins.; Lyons to Paris, 2 hrs. 50 mins.; Paris to Cricklewood, 2 hrs. 40 mins.

On the way back he carried a passenger from Athens to Paris.

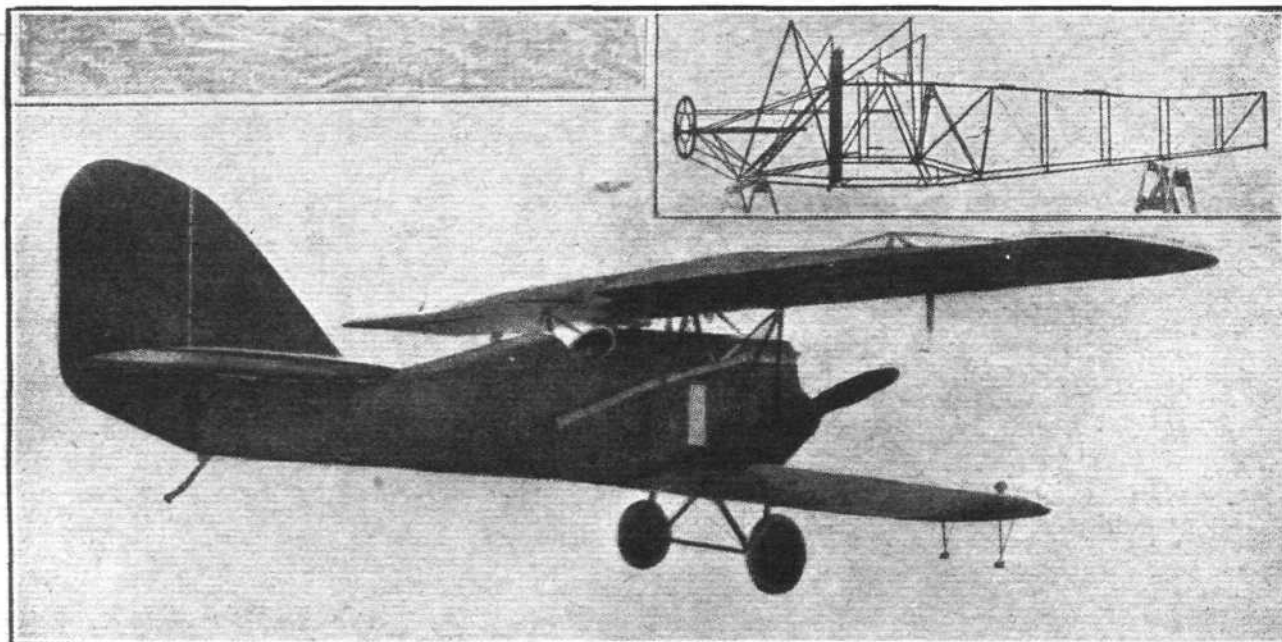
IN reading some of our foreign aeronautical exchanges we have noted from time to time that *FLIGHT* is "quoted" occasionally—but not too often. We only wish it were otherwise. When we are quoted it is generally some quite minor mention of ours. *Per contra* when whole articles—illustrations and all—are "lifted" bodily from *FLIGHT*, original articles that have often entailed a vast amount of technical work, it is curious that somehow there never appears

to be room to squeeze in either in front or at the end, that little word "*FLIGHT*"! We have had many times, in over flagrant cases, to draw attention to this lapse—there are honourable exceptions—and what we should prefer is to let the minor items from *FLIGHT* go without "quotes" as our



A NEW WESTLAND NAPIER LIMOUSINE: This machine, which has been built for the Air Ministry, is very similar to that which won the Competition at Martlesham last year, but minor modifications have been made. Our photo. shows the machine going for a trial flight piloted by Capt. Keep.

respective contemporaries' original work, and for room to be found, recognition to *FLIGHT* for the really helpful articles which are generously annexed. At times the selection of passing items to which credit is duly given to *FLIGHT* is, by contrast, quite ludicrous. Filching without acknowledgment may be very complimentary, but it's not honest.



The Curtiss N.P.I. (Night Pursuit) Cantilever Biplane, which has recently undergone static tests in U.S.A. It is fitted with a Liberty-6 engine. Inset is shown the tubular steel construction of the fuselage.

AIRSHIP SHEDS AND THEIR ERECTION

CLOSELY allied with the problem of using airships for commercial purposes is the question of suitable buildings in which to erect and repair the ships. Even for war purposes the shed problem is a serious one, and it is probably true that the progress of airship design has more than once been hampered by considerations relating to available shed space. Obviously, when time was pressing it was no use to design airships so large that they could not be housed in existing sheds, if new sheds could not be built for them in time. Thus designers were prevented from getting the best results because they were restricted to certain overall dimensions determined by existing buildings. For commercial work it would appear that the tendency will be towards larger ships. Consequently, in thinking of the commercial airship of the future one must not leave out of consideration that very important item, the shed. It is true that the mooring mast promises to reduce the number of sheds required to those necessary for building, erecting and overhauling the airships, but on the other hand, these will require a greater margin of space over and above that required by the actual outline of the ship, so as to allow space for working on the ship, where a housing shed (for want of a better term) need be very little larger than the outside dimensions of the airship. It will therefore be seen that the question of airship sheds is a very important one, and one about which comparatively little has been published hitherto. We therefore welcome the reading of a paper on this subject by Mr. Luke Hamilton Larmuth, Assoc. M.Inst.C.E. before the Institution of Civil Engineers on April 5, 1921. The paper, which was entitled "Airship sheds and their erection" was one of very great interest, and was admirably presented, the subject matter being well written and the numerous illustrations uncommonly well reproduced. We should have liked to quote very fully from the paper, but space does not allow of referring to the technical details, and we must confine ourselves to calling attention to a few of the points that are of more general interest.

When war broke out in 1914 Great Britain had only a few non-rigid airships, no rigids, and the construction of airship sheds in the British Isles was in its infancy. The only sheds of any importance actually built or building at that date were:—

One shed	300 ft.	long by	85 ft.	wide by	65 ft.	high.
"	355	"	60	"	75	"
"	354	"	65	"	92	"
"	553	"	110	"	100	"
Two sheds	544	"	150	"	98	"

Little detail information as to the design of modern German sheds was available, and the problems connected with the design of sheds for rigids had to be worked out practically *ab initio* under trying war conditions. Some idea of the magnitude of the work involved can be gathered when it is stated that some sixty-one airship sheds were manufactured, varying in span from 45 ft. to 180 ft., in height from 50 ft. to 130 ft., and in length from 150 ft. to 840 ft. The total floor area approximates to 79 acres.

In the following table are found certain particulars of heds for rigid airships, built during the War period:—

Airship Sheds for "Rigid" Airships, 1914-1919.

Length, centre to centre of end trusses.	Width to clearance lines.	Height to clearance line.	Gross floor area.	Total weight of steelwork.	Weight of steelwork per sq. yd. of floor area.	Weight of steelwork per sq. yd. of effective floor area (clearance lines).	Total capacity of shed.	Number of sheds constructed to same design.
Ft.	Ft.	Ft.	sq. yds.	Tons.	Cwts.	Cwts.	Cub. Ft.	
708.5	150	100	18,900	2,216	2.35	3.76	15,360,000	3
756.0	180	110	21,200	3,665	3.46	4.85	19,981,000	3*
700.0	150	100	17,300	2,665	3.08	4.57	15,441,000	1
700.0	150	100	18,900	1,915	2.03	3.29	15,222,000	1
720.0	150	100	18,600	2,300	2.48	3.83	15,538,000	1
750.0	†150	130	34,350	5,208	3.03	4.17	38,043,000	1
840.0	150	130	22,800	3,064	2.70	4.37	23,144,000	1

* Two of these sheds are only 700 feet long.

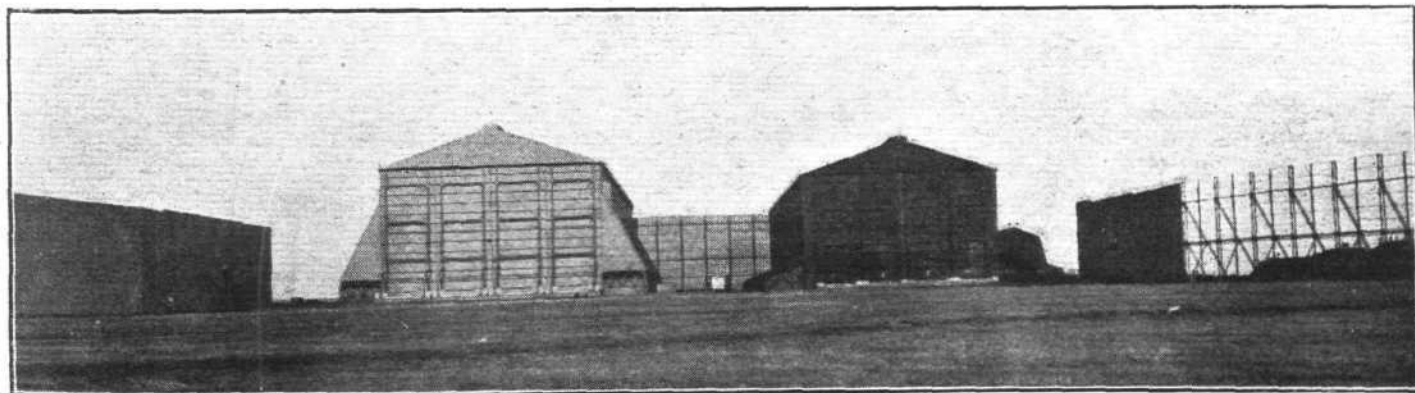
† Each span.

When the sheds for non-rigid airships were being designed the post-war airship policy had not been decided upon, and consequently more attention was paid to cheapness, transport facilities, speed of delivery, and simplicity of erection than to the provision of structures of a more lasting character. The sheds for rigid airships were designed with the intention that they should be permanent structures, and, as far as practicable, of fire-resisting construction. The rapid increase in the size of ships called for sheds of larger and still larger dimensions, and in the circumstances it was useless to attempt to concentrate upon a typical or standard design for non-rigid sheds which would meet all requirements. In the case of sheds for rigids the increasing size of ships was even more serious. As a case in point, some sheds were twice lengthened a matter of about 50 ft. during the course of erection. In another case contract particulars were all ready to issue to contractors, when the dimensions proposed were considered insufficient, and fresh particulars had to be prepared.

The structures of the rigid airship sheds have been made entirely of steel, and the smaller sheds of timber or steel, or a combination of timber and steel. Reinforced concrete was considered, but the proposal to use this material did not mature. Some of the earlier sheds were covered with canvas, but this was found to have a very short life and, with the exception of the special portable sheds, it was replaced with corrugated iron.

As the subject of sheds for rigid airships is of such general interest we publish in full Mr. Larmuth's description of the largest of these built in this country. With regard to this shed the lecturer said:—

"This is a twin shed, designed to house two of the latest rigid airships. It is the largest shed yet built, and for total capacity will rank easily as the largest building in this



"Flight" Copyright

TWO OF THE AIRSHIP SHEDS AT PULHAM: On the left is seen the large shed in which are housed the surrendered German airships "L. 64" and "L. 71." This shed is 756 ft. long, 180 ft. wide, and 110 ft. high. The shed on the left is somewhat smaller, its length being 710 ft. long, 150 ft. wide, and 100 ft. high. Note the wind screens.

country, if not in the world. It covers an area of 754 ft. by 410 ft., equal to 7.1 acres or, together with the space occupied by the doors at either end, 8½ acres.

General Description.—The cross section comprises two spans, each 150 ft. by 130 ft. high, and two side portions supporting these, forming annexe workshops, each 35 ft. wide inside. The clear height at the centre of the main spans is 140 ft., and to the ridge of the roof a total of about 160 ft. Sliding doors are provided at both ends of the sheds, making four clear doorways, each 150 ft. by 130 ft. The doors are independent of the shed, and are of the semi-ballasted type, running on parallel tracks 48 ft. apart. Some details of these doors are given later.

The main spans of the shed are three-pin arches, the springing pin on the outer side, of 3 ins. diameter, resting at a height of 60 ft. from the floor on a fixed triangular framework, which forms the annexe portion; the pin on the inner side rests on the top of the central columns, 97 ft. 6 ins. above floor. The main ribs are spaced 30 ft. centres and carry longitudinal, side, and roof girders 18 to 22 ft. apart, on which rest intermediate rafter beams, two in each 30-ft panel, so that the purlin-bars are supported every 10 ft.

The arch spans are independent of each other. Where they come together under the valley-gutter, there is a clear space of 4 ins. left and no connection is made between the main ribs except that they are held in line with each other by means of a sliding contact. Sliding joints are also arranged at each end of the piece of bottom chord under the top pin, while at the top of the ventilator there is nothing carried across except the curved corrugated-sheet covering. The arch ribs, therefore, are practically free to take up without injury any little variation in levels due to temperature or possible settlement of the foundations. A complete system of wind-bracing is provided on the bottoms of the rafters, from pin to pin, in ten of the twenty-five panels.

The annexe framework is of rigid construction, well braced on both sides of the columns, which are all connected together at the top by a braced box-girder 5 ft. by 3 ft. in cross section. At 17 ft. above the floor, cross and longitudinal girders are inserted to carry a concrete ceiling. This lower portion of the annexe framework is completely shut off from the main building with brickwork in Portland-cement mortar, the outer walls also being of brick. Cross walls occur at intervals, which divide this portion into stores, workshops, offices, &c., although at present only one annexe has been so filled in. The foundations to the annexe are of reinforced concrete, the outer blocks each having four 1½-in. anchor bolts set at an angle of 45° to resist uplift under wind pressure.

The centre portion of the shed is 97 ft. 6 ins. high. The main columns are 12 ft. wide at the top, spreading out at the foot to 30 ft., where a light steel member connects the legs together below floor level. The bottom bracing is arranged to allow of a railway track 4 ft. 8½ ins. gauge running down the centre. The columns, 30 ft. apart, are rigidly braced together with two rows of longitudinal box-girders and diagonal bars in ten panels similar to the roof portion. The foundations are reinforced, and both legs are rigidly anchored down with four 1½-in. bolts. The saddles for the springing pins of the arches are built up of steel, no castings being used in the construction of the shed.

A concrete floor, with a minimum thickness of 4 inches, covers the entire area of the shed and annexes (about 34,300 sq. yds.); it is laid over a bed of hard core 4 ins. deep. Longitudinal and cross trenches are inserted in the floor as required for hydrogen mains, heating pipes, drains, etc., and mooring blocks are provided at intervals in the floor for anchoring the ships.

The ventilator framework runs the full length, having fixed galvanized louvres each side. To prevent the inlet of driving rain or snow, a small-mesh continuous wire guard is fixed outside the louvres, leaving a few inches clear space between. The sides and roof of the shed are covered with No. 20 gauge corrugated galvanized sheeting. Explosion flaps are fitted high up on each side of the main building and run the full length. These are light steel frames, 7 ft. deep, in 10-ft. lengths, hinged at the bottom and loosely held at the

top, and covered with corrugated sheeting. Seven emergency or panic doors are provided on the ground floor, and give direct outlets without passing through the annexe workshops. Runway beams and gangways are provided as previously described.

The main roof is drained into three pressed-steel gutters ¾-in. and 1-in. thick, which discharge direct into sixteen storage tanks, each of 5,300 gallons capacity. These tanks are situated close under the eaves-and valley-gutters, and are supported on twelve separate steel towers 120 ft. high. From the tanks, 6-in. overflow and 3-in. service pipes are led down the towers, the latter being connected up to 4-in. service pipes running longitudinally under the floor to which fire hydrants are attached at suitable intervals. The tanks are covered in and the sides and bottom are lagged, the supply pipes also being lagged as a protection against frost.

To facilitate the entry of ships at night, lamps are arranged just inside the shed all round the portal frames of the doors. Gable gangways, platforms and ladders are fitted up for getting at these lights conveniently. Similar provision has also been made on the sheds previously described. The constructional material is practically all steel, but where wood is used it is coated with asbestos paint to render it less inflammable.

An observation cabin, 10 ft. by 6 ft., is erected on the ridge at one end of the shed, with access from the central gangway below, and an outside fire-escape has now been added, giving an outer gangway and ladder to the ground. Arrangements were made for covering some of the steel members inside the shed and round the portal frames with wool padding, as a protection to ships, but this was later abandoned, as were also arrangements for sliding curtains to all windows and skylights.

The site for this shed is practically level and consists of about 12 ins. of soil, overlying 6 ft. of clay, which rests on sand and warp. It was decided, under these conditions, to rest the shed on the crust of clay, and in order to avoid the possibility of penetrating it, the maximum depth of foundations was fixed at 3 ft. below ground level, the floor level being 6 ins. above the ground line. The depth of concrete was therefore limited to a maximum of 3 ft. 6 ins. Before fixing on the permissible load for this clay, tests were made on the site, and from the results obtained the allowable pressure per square foot was fixed at 15 cwt.

Whilst the temperature stresses in the main spans will possibly be very small transversely, the question of longitudinal expansion and contraction in long steel buildings usually presents a little difficulty. Assuming a maximum range of temperature in this country of 100° F., the total change in length of the shed would be nearly 5 ins., if the structure were quite free to move. But the temperature at the top of the roof will seldom be the same as that at floor level, say, and though the wind-bracing may not prevent the upper portion expanding, expansion at the base is almost impossible. Again as the actual erection of the building might extend over a period of 12 months, it is impossible to fix on any initial temperature.

In most steel buildings it is found the bases remain fast, and in hot weather the top expands so that the ends project or lean outwards a few inches. In the present case the shed has been divided into three portions, connected together with two expansion panels. In these panels all members have slotted holes at each end, which arrangement is also found convenient for adjustment during erection. It is assumed that each end of the shed might possibly lean over about 2 ins. at the top, and due allowance for this is made in the design of the main doors.

The question of expansion is being investigated on this shed and also on three other sheds where no provision has been made for changes due to temperature variations. Up to the present the results on two of the latter sheds indicate a longitudinal expansion of about ¼ of an inch in 700 ft. for a rise of one degree in the temperature of the air in the roof of the shed. In a transverse direction the increase is about 1/10 of an inch in a span of 180 ft. for a rise of one degree in the temperature. These tests have, so far, only been carried out with a range of 30° of variation.



Duties on Aeroplanes, Etc.

FROM the Department of Overseas Trade information is now available in regard to duties leviable upon aeroplanes, aero engines, etc., on importation into various countries. Particulars cover Argentine, Australia, Austria, Belgium, Brazil, Bolivia, Bulgaria, Canada, Chile, Columbia, Czecho-

Slovakia, Denmark, Dominica, Ecuador, France, Greece, Italy, Japan, Mexico, New Zealand, Norway, Nicaragua, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey and U.S.A.

Information upon this subject is readily given by the Department upon application.

THE ROYAL AIR FORCE

London Gazette, March 22

Medical Branch

J. H. Peek, M.D., Ch.B., D.P.H. is granted a short service commn. as Adqn. Leader, for a period of two years on the active list, with effect from, and with seny. of; March 1.

Flying Branch

Sec. Lieut. C. K. G. Brown to be Lieut.; June 18, 1919 (since demobilised). Sec. Lieut. (Hon. Capt.) F. T. Gummer relinquishes his temp. commn. on appointment to T.F. Res., and is permitted to retain the rank of Capt. Sec. Lieut. C. W. Davies relinquishes his temp. commn. on ceasing to be empld.; Feb. 5, 1919.

Transferred to Unemployed List.—Sec. Lieut. J. Stables; March 20, 1919. Lieut. W. E. Wood; July 12, 1919 (substituted for *Gazette*, July 29, 1919).

Administrative Branch

Capt. (Hon. Maj.) J. W. Higgins relinquishes his temp. commn. on appt. to T.F., and is permitted to retain rank of Maj. Sec. Lieut. D. MacKay relinquishes his temp. commn. on ceasing to be empld.; May 4, 1918.

Technical Branch

Sec. Lieut. P. C. Jones to be Lieut. Grade A; March 10, 1919 (since demobilised) (substituted for *Gazette*); April 20, 1920. Lieut. J. H. Falconer relinquishes his temp. commn. on appt. to T.F., and is permitted to retain his rank. Sec. Lieut. H. W. Sharnan relinquishes his temp. commn. on appt. to T.F. Res., and is permitted to retain his rank.

Transferred to Unemployed List.—Sec. Lieut. K. Mines; Jan. 15, 1919. Maj. J. E. Pearce; Jan. 24, 1919.

Lieut. G. Audas is placed on ret'd. list; March 23.

Medical Branch

J. C. Johnson is granted a temp. commn. as Flt. Lieut. with effect from and with sen. of March 4. Flt. Lieut. L. G. Davies, M.A., M.B., relinquishes his temp. commn. upon termination of his appt.; March 14.

Stores Branch

R. E. Steggall is granted a temp. commn. as Flying Offr. for accountant duties; March 5.

Memoranda

Hon. Sec. Lieut. E. Y. S. Lacey relinquishes his hon. commn.; Feb. 5, 1920. The seny. of all offrs. granted commns. in the Stores Branch for accountant duties is provisional only. The final seny. list of all such offrs. will be promulgated when the estab. is completed.

London Gazette, March 25

Flying Branch

Sec. Lieuts. (since demobilised) to be Lieuts.:—D. R. Morgan; Dec. 27, 1918. J. McGilchrist; Feb. 19, 1919.

The following Pilot Officers (since demobilised) to be Flying Officers:—J. P. Armitage; Aug. 12, 1919. E. R. N. Main; Aug. 14, 1919.

Lieut. (acting Capt.) W. E. Reed, D.F.C., relinquishes his temporary commn. on appointment to T.F., and is permitted to retain the rank of Capt. Lieut. C. H. March relinquishes his temporary commn. on appointment to T.F., and is permitted to retain his rank. Lieut. J. Tennant, M.C. relinquishes his temporary commn. on appointment to T.F. Res., and is permitted to retain his rank. The following Sec. Lieuts. relinquish their temporary commns.:—J. L. McL. Oliphant, G. Wilkie.

The following Lieuts. are transferred to the unemployed list:—H. O. Hope; Sept. 19, 1919 (substituted for *Gazette*, Oct. 10, 1919. C. E. Lovick; Sept. 27, 1919 (substituted for *Gazette*, Nov. 25, 1919). J. N. Galloway; Oct. 11, 1919.

The initials of Sec. Lieut. J. N. Waterworth are as now described, and not as *Gazette*, July 12, 1918.

Gazettes of dates indicated, relating to the undermentioned, are cancelled:—Prob. Observer Officer W. J. Ward; July 12, 1918. Sec. Lieut. H. E. Holmes; Oct. 15, 1918.

Administrative Branch

Lieut. (Hon. Capt.) H. D. Scrowcroft relinquishes his temporary commn. on appointment to T.F., and is permitted to retain the rank of Capt. The following Lieuts. relinquish their temporary commns. on appointment to T.F., and are permitted to retain their ranks:—T. J. R. Wilson, G. G. Raphael. Lieut. E. R. W. Close relinquishes his temp. commn. on appointment to T.F. Res., and is granted the rank of Capt. The following relinquish their temporary commns. on ceasing to be employed:—Lieut. J. P. Scott; Nov. 9, 1918. Sec. Lieut. W. E. Gillard; May 4, 1918. *Gazette*, May 23, 1919, relating to Sec. Lieut. J. H. Payne, M.C., is cancelled.

Technical Branch

Sec. Lieut. (Hon. Lieut.) E. R. Parsons relinquishes his temp. commn. on appointment to T.F., and is permitted to retain the rank of Lieut. Lieut. A. J. Ramsey relinquishes his temporary commn. Sec. Lieut. P. J. Smail is transferred to the unemployed list; June 30, 1919. The names of Lieut. W. S. Clarke Stephens are as now described, and not as *Gazette*, Aug. 15, 1919.

Memoranda

Three Cadets are granted hon. commns. as Sec. Lieuts., with effect from the date of their demobilisation.

Hon. Sec. Lieut. W. R. S. Griffiths relinquishes his hon. commn. on appointment to T.F.

London Gazette, March 29

Permanent Commissions

Wing Comdr. S. A. Hedden, O.B.E., is transf'd. to General List from Stores Branch; March 10. Flying Offr. S. B. Collett resigns his perm. commn., and is granted rank of Capt.; March 30.

Medical Branch

The name of Flight Lieut. A. E. Barr-Sim, M.B., is as now described, and not as *Gazette*, March 15.

Short Service Commissions

Flying Offr. R. B. Luard is granted a short service commn., retaining his present rank and seny.; March 31.

The following are granted short service commns. as Pilot Offrs. on probation with effect from and with seny. of March 29:—H. A. C. Atkinson (from Unemployed List), J. N. Boothman, T. W. S. Brown, P. K. Campbell, D. M. N. Coles, A. B. Cree, J. Dawson, F. M. Dingle (from Unemployed List), E. S. Edwards, B. E. Embry, A. Findley (from Unemployed List), A. D. Huthersoll Foster (from Unemployed List), C. Gardner (from Unemployed List), R. G. R. Godby (from Unemployed List), E. C. Moon (from Unemployed List), O. L. Niven, G. J. Rayner.

Flying Offr. H. T. Pennell resigns his short service commn., and is granted rank of Capt.; March 30.

Stores Branch

Flying Offr. R. H. Smyth, M.C., granted a short service commn., retaining his present rank and seny.; June 17, 1920 (for three years on Active List).

Flying Branch

Prob. Flight Offr. H. G. Lock is granted temp. commn. as Sec. Lieut. (A.) Oct. 30, 1918. Lieut. (Hon. Capt.) W. H. Costello relinquishes his temp. commn. on appt. to T.F., and is permitted to retain rank of Capt.

The following Lieuts. relinquish their temp. commns. on appointment to T.F., and are permitted to retain their rank:—K. V. C. Lewis, H. R. Mechan. Sec. Lieut. L. Beavis relinquishes his temp. commn. on appointment to T.F. Res., and is permitted to retain his rank. The following relinquish their temp. commns. on ceasing to be employed:—Lieut. G. M. Lees, M.C., D.F.C.; Jan. 1, 1919. Sec. Lieut. G. Rowe; Dec. 9, 1918. Lieut. J. G. Dainty relinquishes his temp. commn. on account of ill-health, caused by wounds, and is permitted to retain his rank; March 12.

The following are transferred to the Unemployed List:—Sec. Lieut. G. R. Wells; Feb. 8, 1919. Lieut. J. McGilchrist; Sept. 2, 1919 (substituted for *Gazette*, Oct. 28, 1919. Sec. Lieut. F. J. S. Clayden; Sept. 4, 1919 (*Gazettes*, Oct. 24, 1919, and Jan. 28 are cancelled). Sec. Lieut. H. P. Johnston; Sept. 15, 1919. Lieut. E. R. N. Main; Aug. 5, 1920 (substituted for *Gazette*, Aug. 17, 1920).

Gazettes of dates indicated relating to the following Probationary Flight Officers are cancelled:—R. N. Barber; Aug. 23, 1918. E. Beardsworth; Nov. 1, 1918. E. Hudson; Feb. 14, 1919.

Administrative Branch

Lieut. (actg. Capt.) D. E. B. K. Shipwright relinquishes his temp. commn. on appt. to T.F., and is permitted to retain the rank of Capt.

Technical Branch

Sec. Lieut. G. Johnson to be Lieut. Grade B, without pay and allices. Dec. 30, 1918 (since demobilised) (substituted for *Gazette*, July 29, 1919).

Pilot Offr. J. M. Wyer, D.S.M., to be Flying Offr.; Oct. 1, 1919 (substituted for *Gazette*, March 23, 1920).

The following are transferred to the Unemployed List:—Lieut. G. Johnson; Jan. 25, 1919 (substituted for *Gazette*, March 8). Lieut. J. H. Payne; April 12, 1919 (substituted for *Gazette*, Feb. 15).

Medical Branch

The following are granted temp. commn. in the ranks stated, with effect from, and with seny. of, the dates indicated:—Flight Lieut. C. W. T. Baldwin, M.R.C.S., L.R.C.P.; March 24. Flying Offr. F. T. Allen, M.R.C.S., L.R.C.P.; March 29.

Memoranda

One Cadet is granted an hon. commn. as Sec. Lieut. with effect from the date of his demobilisation.

Gazette of June 15, 1920, relating to P.F.O. H. G. Lock is cancelled.

Hon. Sec. Lt. F. L. S. Allen relinquishes his hon. commn. on appt. to T.F.

London Gazette, April 1

Permanent Commissions

Flight Lieut. C. H. C. Smith, D.S.C., resigns his commn., and is granted rank of Maj.; April 1. Wing Comdr. C. E. Risk, D.S.O., is placed on half-pay, Scale A; March 23 (substituted for *Gazette*, March 22). Flight Lieut. P. F. Fullard, D.S.O., M.C., A.F.C., is placed on half-pay, Scale B, from Aug. 1, 1919, to Nov. 12, 1919, both dates inclusive. Pilot Offr. H. W. Foote is placed on half-pay, Scale B, from March 1 to March 22, both dates inclusive.

Short Service Commissions

Flight Lieut. E. St. C. Harnett, O.B.E., empld. on Law duties, is promoted to the rank of Squad. Ldr.; April 1.

Medical Branch

The follg. are granted temp. commns. in ranks stated, with effect from, and with seny. of, dates indicated:—

Flight Lieuts.—D. Le Bas, M.R.C.S., F.R.C.P.; April 1. W. R. Reith, M.D., C.M.A.M.; April 1.

Flying Offr.—J. A. Perdrau, M.D., L.S.A.; April 1.

London Gazette, April 5

Flying Branch

The following Sec. Lieuts. relinquish their temp. commns. on appts. to T.F., and are permitted to retain their rank:—G. A. Body, H. P. Johnston. Maj. M. G. Lee relinquishes his temp. commn. on return to Army duty Feb. 5.

Transferred to the Unemployed List.—Lieut. D. R. Morgan; Jan. 18, 1919 (substituted for *Gazette* March 28, 1919). Sec. Lieut. A. K. Gill; July 13, 1919. Sec. Lieut. A. J. R. Murray; Sept. 12, 1919 (substituted for *Gazette*, Oct. 28, 1919). Sec. Lieut. J. F. R. Greef; Oct. 10, 1919 (substituted for *Gazette*, Nov. 21, 1919).

Gazettes of the dates indicated relating to the follg. are cancelled.—Prob. Flight Offr. G. Prickett; July 5, 1918. Flight Cdt. K. S. Stefanus; Sept. 20, 1918. 446931 Flight Cdt. T. H. Little; Nov. 22, 1918. Sec. Lieut. J. Cave; March 7, 1919. Lieut. H. S. Taylor, M.M.; Feb. 10, 1920.

Administrative Branch

Sec. Lieut. J. Cameron to be Lieut.; July 20, 1919 (since demobilised). Lieut. (Hon. Capt.) Sir M. T. Stapleton, Bt., relinquishes his temp. commn. on ceasing to be empld.; Jan. 23, 1919. *Gazette*, Nov. 9, 1920, relating to Sec. Lieut. (actg. Lieut.) J. McCarthy, is cancelled, and *Gazette*, Sept. 26, 1919, stands.

Memoranda

Three Cadets are granted Hon. Commns. as Sec. Lieuts., with effect from date of their demobilisation.

London Gazette, April 8

Permanent Commissions

Stores Branch.—Flying Offr. G. Felstead, D.C.M., is placed on the Ret. List; April 6.

Short Service Commissions

The following are granted short service commns. in the ranks stated, with effect from the dates indicated, retaining their seny. in the substantive rank last held prior to the grant of this commn., except where stated:—

Flying Officers.—O. D. Freeman, J. Oliver, A.F.C.; March 22.

Flying Officer (from Pilot Officer).—G. A. Atkinson; March 22, and with seny. of that date.

Pilot Officers (on probation) with seny. of the dates indicated:—C. G. Dromgole, D. R. Loch, J. V. Roberts, J. W. Stansfeld (previously served as Cdt.); March 29. G. W. Selby Lowndes; April 4.

Flt. Lieut. C. C. Treatt resigns his commn. and is granted rank of Maj.; March 26. Flying Offr. H. J. Gye resigns his commn. and is permitted to retain rank of Lieut.; April 6.

IMPORTS AND EXPORTS, 1920-1921

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; and for 1920, see "FLIGHT" for January 13, 1921.

	Imports		Exports		Re-Exportation	
	1920.	1921.	1920.	1921.	1920.	1921.
Jan. ...	£ 2,323	£ 4,459	£ 32,752	£ 87,128	£ 697	£ 2,285
Feb. ...	9,320	2,379	68,932	59,829	—	19
Mar. ...	2,092	14	67,600	118,199	—	1,565
	13,735	6,852	169,284	265,156	697	3,869

Brussels Air-Mail Posting Times

THE Postmaster-General announces that, commencing this week the air mail from London to Brussels will leave earlier than at present. To be included in the mail postal packets should be handed in at the London chief office not later than 8.15 a.m., or posted at a London district office in time for the early morning collection (at or about 6 a.m.), or elsewhere in London overnight. In the country packets must be posted in time to be forwarded in dispatches due to reach the London train terminus not later than 7 a.m.

Brussels-Paris in 76 min. per Goliath

PILOTING a Farman Goliath, M. D'Or, the Farman pilot, on April 7, reached Paris from Brussels in 1 h. 16 m.

Paris-London Goliaths

THAT the French firms do not intend taking our new subsidy move lying down, is evident from the announcement that the Grands Express Aériens have now eleven Farman Goliaths at their command, and that by April 15 they purpose running the service daily both ways.

Missing Balloon Found

ON March 22, a U.S. Naval balloon left Pensacola, Florida, for a voyage, five men being on board. All trace of her was lost, and it was feared she had descended into some swamp along the Florida coast. On April 9, it is now reported from New York, a fishing-boat picked up the balloon, but there was no sign of the occupants.

Various Mishaps

FROM Baghdad we learn, with regret, of an accident last week to Col. Ironside. An aeroplane, in which he was flying, made a forced descent near Samawa, in a duststorm, resulting in injury to the General's thigh. He was conveyed to Basra, and his condition is said to be satisfactory.

On Sunday at Bruges, during the unveiling of a monument in the stadium of the Sporting Club in honour of members who fell in the War, an aeroplane from Brussels, while descending to drop a wreath upon the monument, crashed to the ground, and two airmen were killed.

Lieut. Alvarado, of the Spanish Air Force, is reported dead following a flight at the Quatre Vents Aerodrome, Madrid, when his military plane took fire and he was severely injured.

Whilst looping the loop in an Albatros machine at Haparanda last week end, Lieut. L. Jungberg, a Swedish aviator, crashed, he and a passenger being fatally injured.

IN PARLIAMENT

Eastbourne Aerodrome

MR. RAPER, on April 7, asked the Secretary of State for Air who is now responsible for the Eastbourne aerodrome, and why the same has not been retained by the Air Ministry as a supplementary landing ground, in view of the fact that this aerodrome, besides being one of the oldest in the United Kingdom, is also in the most important geographical position from the point of view of commercial aviation; and whether the Air Ministry notice, dated April 1, cancelling notice to airmen, No. 135, dated December 9, 1920, indicates that this aerodrome is again fit for use?

Mr. McCurdy (Joint Parliamentary Secretary to the Treasury): I have been asked to reply. This aerodrome was licensed to the Eastbourne Aviation Company, who asked for a cancellation of the licence in December last, and have since demolished the aerodrome. It was considered, with others, from the point of view of retention by the Air Ministry, but the circumstances did not justify its selection for the purpose. The answer to the last part of the question is in the negative.

Mr. Raper: Is it not a fact that notice was issued on April 1 cancelling No. 135?

Mr. McCurdy: I must ask for notice of that question.

PUBLICATION RECEIVED

The Problem of Soaring Flight. By E. H. Hankin, M.A., Sc.D. Reprinted from the *Proceedings of the Cambridge Philosophical Society*, Vol. XX. The University Press, Cambridge.

SIDE-WIND

AT Brooklands, where Mr. G. H. Hawker displays equal grit and resource on the track as he does in the air, an incident occurred on Easter Monday, not included in the programme, which has just been told unto us. Hundreds of motor-cars of all sizes, makes and descriptions were packed together closely and indiscriminately. One, and one only, was stolen—a 1920 Model A.C. The thief's selection, our informant shrewdly surmises, was probably decided by the necessity of getting away with the utmost speed. We shall hope to hear this priceless little car has before long found its way home again.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1919

Published April 7, 1921

- 27,581. E. S. G. REES. Apparatus for manoeuvring aircraft. (159,927.)
- 29,595. L. B. JAHN. Parachute apparatus. (159,944.)
- 29,931. W. H. CROZIER. Means of attaching persons or packages to parachutes. (159,948.)
- 30,792. F. J. LORD and R. A. TAYLOR. Magnetos. (159,975.)
- 32,432. A. AHLBRECHT. Self-stabilising aeroplanes. (160,024.)
- 32,828. J. HARRISON. Masts for aeroplanes, etc. (160,027.)

Published April 14, 1921

- 18,457. SPERRY GYROSCOPE CO. Gyroscopes. (160,192.)
- 24,923. E. A. SPERRY. Plumb-line indicators for aircraft. (133,714.)
- 25,522. P. ST. G. KIRKE and BRISTOL AEROPLANE CO., LTD. Water-tube boilers or steam generators. (160,205.)
- 28,978. R. P. PESCARA. Screw propellers. (160,224.)
- 31,345 and 31,346. J. ERSKINE-MURRAY, J. ROBINSON and H. L. CROWTHER. Radio-navigational apparatus. (160,250 and 160,251.)
- 31,355. F. WOODS. Planes. (160,253.)
- 31,767. LUFTFAHRZEUGBAU SCHUTTE-LANZ. Toothed wheels. (160,277.)

APPLIED FOR IN 1920

Published April 7, 1921

- 1,516. A. LUPTON. Aircraft propulsion. (160,041.)
- 3,343. P. MAGNI. Aeroplanes. (160,065.)
- 5,663. BLACKBURN AEROPLANE and MOTOR CO., LTD., and A. C. THORNTON. Torpedo-carrying aircraft. (160,077.)
- 7,479. J. J. M. A. E. SCHNEIDER. Apparatus for actuating rudders by means of auxiliary engine. (157,049.)
- 14,867. A. BOERNER. Propellers. (160,102.)
- 15,846. BOULTON AND PAUL, LTD., and J. D. NORTH. Built-up thin metal structures for aircraft. (160,107.)
- 27,355. A. J. YEO. Rotary engines. (160,125.)

Published April 14, 1921

- 637. P. R. CARTWRIGHT and E. T. GLANVILLE. Clinometer. (160,316.)
- 18,126. DAIMLER MOTOREN GES. Aeroplane balancing and stabilising means. (145,766.)
- 20,295. SPERRY GYROSCOPE CO. Gyro-compasses. (148,374.)
- 20,486. AGO FLUGZEUGWERKE GES. Aeroplane rudders. (148,515.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xi and xli).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM			ABROAD*		
	s.	d.		s.	d.
3 Months, Post Free...	7	7	3 Months, Post Free...	8	3
6 " " " " " "	15	2	6 " " " " " "	16	6
12 " " " " " "	30	4	12 " " " " " "	33	0

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

* European subscriptions must be remitted in British currency

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring "FLIGHT" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.